THE

# INDIA DIRECTORY,

*&c. &c.*

THE

# INDIA DIRECTORY,

OR,

## DIRECTIONS FOR SAILING

TO AND FROM THE

# EAST INDIES,

## CHINA, AUSTRALIA, AND THE INTERJACENT PORTS

OF

## AFRICA AND SOUTH AMERICA:

COMPILED CHIEFLY FROM

ORIGINAL JOURNALS OF THE HONOURABLE COMPANY'S SHIPS,

AND FROM

OBSERVATIONS AND REMARKS,

RESULTING FROM THE EXPERIENCE OF TWENTY-ONE YEARS IN THE NAVIGATION OF THOSE SEAS.

BY

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They that go down to the sea in ships, that do business in great waters; these see the works of the Lord, and his wonders in the deep.—PSALM cvii. v. 23, 24.

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VOLUME FIRST.

**FIFTH EDITION.**

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TO THE

# HONOURABLE THE COURT OF DIRECTORS

OF THE

# EAST INDIA COMPANY,

THE Fifth Edition of the late Captain Horsburgh's SAILING DIRECTIONS is respectfully inscribed, in grateful remembrance of their distinguished patronage of the Author's labours to promote the safety of navigation, by

HIS FAMILY.

LONDON, *June*, 1841.

2 Vols.



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# PREFACE TO THE FIFTH EDITION.

The long acknowledged value of the late Captain Horsburgh's East India Directory, while it has afforded to the Editor a powerful motive for using his best efforts to maintain undiminished its just reputation, has at the same time rendered it unnecessary for him to offer any thing more by way of preface, than a brief notice of those points in which this Fifth Edition will be found to differ from the preceding editions.

The general plan of the work has of course been sedulously preserved; but where any alteration in the mere arrangement of the details seemed likely to promise either greater perspicuity in the directions, or increased facility of reference, it has been deemed advisable to adopt it. These alterations will chiefly appear in the division and order of a few of the chapters,—in the more careful restriction of each subject to its respective division,—and in the addition of a running title at the head of each page. It has also been thought that it would be useful to the mariner to make *all* the bearings *Magnetic;* for although the system adopted in the former editions, of employing the compass for winds and courses, and the true rhumbs for bearings and currents, might have had its advantages, yet this distinction might not be always remembered in the hurried consultation of the book in moments of anxiety and danger.

Captain Horsburgh's Introduction remains unaltered, except in that part of it relating to the subject of Local Attraction, which in this edition the Editor has endeavoured to adapt to the present more advanced state of the science of Magnetism, and to illustrate by the introduction of some easy rules, now commonly employed by seamen.

It is also necessary to state that the Editor has availed himself of much important information, which would assuredly have been adopted by the candid and vigilant

author had his life been spared. For instance—the positions on the Coast of Brazil have been corrected from the surveys of Baron Roussin, Captain Fitz-Roy, and others. Those of the Canary Islands and the Western Coast of Africa, from the Admiralty surveys recently completed by Captain Vidal. A slight change has also been made in the longitudes of the Eastern Coast of Africa, as it appears that Captain Owen, whose authority is every where cited by Captain Horsburgh, had assumed the longitude of the Cape of Good Hope five minutes less than that which has been subsequently established at the Royal Observatory of that place.

Elaborate directions for the navigation of the Red Sea, by Captains Moresby and Elwon, of the Indian Navy, lately published by the Honourable East India Company, have, by the liberal permission of the Court of Directors, been transferred to this work verbatim; and much additional information on the coast of Arabia, the Persian Gulf, the River Indus, and the Maldiva Islands, has been added from the admirable surveys conducted under their authority by the officers of the Indian Navy.

A minute description of the South-West and South coasts of Ceylon, by Mr. Twynam, the Master Attendant at Point de Galle, has also been inserted; as well as several contributions to the hydrography of the West and North-west Coasts of Australia, and of Bass's Straits, by Captain Wickham, of H.M.S. Beagle, under whose direction the Admiralty survey of those distant regions is now proceeding.

In conclusion—the intimate knowledge of this work which the Editor has necessarily acquired in preparing it for the press, will perhaps exonerate him from apparent presumption in here adding his testimony to the just and general opinion of its great merits;—and in expressing his conviction that the vast accumulation of facts, together with the sound and seamanlike advice and directions which it contains, cannot fail to render the India Directory an enduring monument of the unwearied industry, skilful resources, and sagacious judgment, of its celebrated author.

# PREFACE TO THE FOURTH EDITION.

In submitting a Fourth Edition of this Sailing Directory to the public, and to those Navigators who frequent the Oriental Seas and adjacent parts, the author returns his sincere thanks for their candid reception of the former editions of his work, and he trusts that the present will be found still more worthy of public confidence.

To correcting and enlarging the Second Edition with useful information, from discoveries made after the original publication of the India Directory, he devoted a great portion of his time; the result of which will be perceived, by reference to the following localities, the descriptions of which have either been re-written, with many important additions, or comprising original materials.

Geographical situations of the principal harbours and headlands on the Coasts of Spain and Portugal, with directions.—Canary Islands.—Coast of Guinea, and West Coast of Africa.—Chief Harbours on the Coast of Brazil, and Rio de la Plata.—Bouvet's Island.—Gough's Island.—Tristan de Acunha.—Bird Islands, and Doddington Rock, and Knysna in South Africa. South Coast of Terra Australis, and Bass' Strait.—Africa, East, and North-East Coasts to the Red Sea, and Arabian Coast.—Island Mazeira.—Gulf of Persia, nearly all re-written, greatly enlarged, and corrected from late surveys.—Aldabra Islands, true situation ascertained. Several late discovered Shoals, and geographical limits of Saya de Malha Bank.—Maldiva Islands, their principal Channels elucidated, and lost knowledge restored, from original journals and other documents.—Directions for Marmagoa Road. Gulf of Manar.—Great and Little Basses, Ceylon.—Hooringottah River, Bengal.—Directions for Sailing between Malacca Strait, Bengal, and Madras; with many other useful observations and directions.

In the Third Edition, much important information was added to the preceding one, and many valuable discoveries elucidated, among which were the following.

True geographical position of Funchal.—Cape de Verde Islands, and several parts on the West Coast of Africa, from late surveys.—Table Bay, Cape Good Hope.—Algoa Bay, and several places on the East Coast of Africa.—North-West and

Northern Coasts of New Holland, entirely new. Geographical position and description of the Islands and dangers in the Seychelle and Madagascar Seas, mostly all re-written from late explorations and surveys.—Shoals in the Red Sea.—Geographical positions of Headlands on the South Coast of Arabia. In the Persian Gulf, the Eastern Coast of Arabia described, with the correct situations of the Headlands, Towns, Islands, and Dangers adjacent, from the late laborious surveys performed by the officers of the India Navy; the whole of this coast having been formerly unknown to European navigators.

This Fourth Edition, now submitted to the public, has been enriched with so much valuable matter, extracted from recent marine surveys, as probably to render it a *Standard Work* for Oriental Navigation; for the author's constant aim has been, during many years of unremitted attention and research, to render it as perfect as possible. The whole of the Coasts of South, East, and West Africa, Madagascar, Mozambique Channel, and adjacent dangers, have been improved, from the able survey of those parts, by Captain W. F. W. Owen, of the Royal Navy, during four years of great exertion and privation. The Coast of Persia along the East side the Gulf, the South Coast, or Coast of Mukran; the Coasts of Scind at Kattiwar have been described from late surveys of the officers of the Indian Navy, together with those of Socotra and the Red Sea, from the beautiful survey of these localities, now finished, by the same officers. The Eastern Coasts of the Bay of Bengal, and the adjacent Islands, have been improved from the correct surveys of Captain D. Ross, the Company's Marine Surveyor. The geographical positions of the Coasts of Malabar and Coromandel have been corrected from the Great Trigonometrical Survey of Hindoostan. The Eastern Coast of Chinà has been described, and its navigation elucidated, together with a new chart of that coast, from a selection of manuscripts and other materials the author has obtained from Canton, or otherwise; chiefly the result of observations made in vessels which frequent that coast, and carry on a contraband trade in opium.

With these additions, and the diligence used in precluding every species of error, the author hopes that the utility of the India Sailing Directory to British seamen may prove as great as his wishes for their safety and the nautical prosperity of this Great Maritime Empire.

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# INTRODUCTION.

## COMPENDIUM OF WINDS, WAVES, TIDES, CURRENTS, MAGNETISM, VARIATION OF THE COMPASS, &c.

PARTICULAR, OR LOCAL WINDS, WEATHER, AND CURRENTS, are described in the different parts of this work, to which the reader is referred; yet it may, nevertheless, be expedient to give here a summary view of the winds in general, with some remarks on the causes which usually produce those which prevail with more or less regularity on the surface of our globe.

WIND is a current of air, or a part of our atmosphere, in a state of more or less rapid motion; its principal cause is a partial or local rarefaction of the air by heat. When the air is heated, it becomes specifically lighter, and in this state naturally ascending, the less rarefied or colder air rushing into its place to restore the equilibrium, forms a current of air, or what is properly called wind. Heat also increases evaporation, by which the atmosphere is rendered more elastic, and capable of retaining a greater quantity of moisture in the gaseous state than it can when colder; this may be considered as another cause tending to produce diversity in winds and weather, as an addition of moisture expands in the air, and renders it specifically lighter than it would be at the same temperature with humid vapour. Principal causes of winds.

Electricity must be considered as a third cause acting on the atmosphere, and having great influence in the local changes of winds and weather. Currents of air are always produced by the passage of electric matter; and when the atmosphere is expanded by the presence of the electric fluid, and surcharged with aqueous vapour, it is incapable of supporting a great quantity of the latter, which consequently descends in wet fogs or rain, while the denser and more elastic air near the rainy district rushes towards it, to restore the equilibrium.

Winds may be arranged under three distinct heads; *Constant*, *Periodical*, and *Variable*. Constant Winds are those which blow always in the same direction, and are called Trade Winds. Periodical Winds, or those which blow one part of the year in one direction and the other part in a contrary one, are generally called Monsoons. Variable Winds are those which are not subject to any determinate periods or uniformity. Character of winds.

TRADE WINDS seem to be occasioned by the rotatory motion of the earth on its axis, combined with the influence of the sun in rarefying the atmosphere between Trade winds.

the tropics. The cold dense air at the poles would naturally move along the surface of the globe to take the place of the hot rarefied air at the equator; but the earth's rotatory motion, and the gradually increasing velocity of this motion at its surface from the poles to the equator, oblige these polar currents of air to diverge from their meridians on their route to the equator, and ultimately to acquire a direction from East to West.

From the rotation of the earth, the sun's *apparent* diurnal motion is from East to West; consequently, the points of greatest rarefaction, which are those under the sun, must move in continued succession in the same direction with that luminary. The places, therefore, of greatest rarefaction following the sun from East to West, the denser air must move towards them, and thus occasion a constant easterly wind in the ocean remote from land between the tropics.

Hence, by the dense air proceeding from the polar regions in a northerly and southerly direction towards the equator, and afterwards more westerly towards the points of greatest rarefaction, a N.E. wind is produced on the North side, and a S.E. wind on the South side of the equator. These trade winds, both in their direction and limits, incline towards the sun or place of greatest rarefaction; that is, when the sun is near the tropic of Cancer, or returning from it, having greatly heated the northern hemisphere, the S.E. trade wind inclines further from the East point than in the opposite season, and blows with strength towards the place of greatest rarefaction; and its northern limit reaches nearly to, and in some places, beyond the equator. The N.E. trade wind, at the same time, generally inclines nearer the east point than in the other season, blowing with less strength, and becoming contracted in its limits; the southern limit then receding several degrees to the northward of the equator. And in the opposite season, when the southern hemisphere is greatly heated by the sun, the N.E. trade wind blows stronger, inclines farther from the East point, and approaches nearer to the equator; the strength of the S.E. trade wind, at the same time, being diminished considerably by the influence of the sun.

As there is a perpetual current of air proceeding from the Polar regions to the equator, where it is rarefied, while the superior gravity of the cold makes the heated air ascend to the upper regions of the atmosphere, whence it returns to the poles, to preserve the equilibrium, this upper current of air must proceed from the parts in which the heat is greatest, so that by a kind of atmospherical circulation, admirably adapted to the preservation of animal life, the N.E. trade wind below will be attended by a S.W. wind above; and the S.E. trade wind below with a N.W. wind above. This opinion is corroborated by the clouds in the upper part of the atmosphere being frequently seen to move in a direction contrary to the trade winds, and by an instantaneous change of wind often experienced when the limits of the trade winds are passed.

Trade winds are only constant in the ocean at a considerable distance from land; for large islands and continents obstruct the regular currents of the atmosphere, and thereby produce either periodical or variable winds. When land is heated by the influence of the sun, the atmosphere over it becomes rarefied, the air acquires motion, and a wind is produced, blowing from the ocean towards the land. This may be exemplified by the winds on the African coasts, within the limits of the N.E. trade, blowing often from North and N.W. about Cape de Verde; and from S.W. and S.S.W. betwixt the Coast of Guinea and the Cape of Good Hope, within the limits of the S.E. trade; instead of N.E. and S.E., as is experienced when well out from the land, in the open ocean.

When the land of New Holland is heated by the presence of the sun in the southern hemisphere, the wind blows generally from the westward upon the N.W. coast; from the S.W. upon the West coast; from S.W., South, and S.E., upon the South coast; and from S.E. and eastward upon the East coast of that extensive tract of land. Winds, indeed, blow nearly always from the sea, towards the heated atmosphere over the land; but contiguous to shores, sea and land breezes are often experienced.

High land, much more than low land, obstructs the regular progress of winds; for a steady trade wind will pass over a considerable tract of low level land without being much changed in its direction or velocity; particularly if that land be barren and destitute of moisture. But if the wind come in contact with high land or mountains, it is compressed in passing over their summits; as the atmosphere being heated by the sun's rays according to its density is much warmer at the bottom than at the top of mountains; consequently the air is cooled in its ascent, and being frequently condensed into humid clouds or fog, is discharged in wet misty vapour, or in small rain, upon the tops of the mountains. This may be often seen on the Table Mountain at the Cape of Good Hope, or on high islands between the tropics, when the sun shines bright below, with clear weather around.

The presence of the sun in either hemisphere obstructs considerably the regularity and strength of the trade wind in that hemisphere, and *vice versâ*.

The Trade Winds extend generally to about 28° on each side of the equator, and there is usually a considerable space between them, in which light variable winds prevail mostly from the westward, forming in several parts of the globe, near the equator, a kind of monsoon. Limits of the Trade Winds.

The N.E. and S.E. trade winds prevail in the open sea, in the Atlantic and Pacific Oceans, and from the great extent of the latter, they generally blow more steadily in it than in the former; and the S.E. trade wind in the southern Atlantic Ocean blows more steadily than the N. E. trade wind to the northward of the equator, where the ocean becomes contracted between Cape de Verde and the northern extremity of the coast of Brazil; but towards the West India Islands, the N.E. trade wind generally blows steadily between East and E.N.E.

The S.E. trade wind prevails also in the Indian Ocean, from within a few degrees of the East side of Madagascar nearly to the Coast of New Holland, between the parallels of 10° and 28° S.; but in this ocean, from lat 10° S. to the coasts of India, the winds are periodical.

MONSOONS, or PERIODICAL WINDS, are those which blow half of the year from one quarter, and the other half year from the opposite direction. They blow more steadily in the East Indian Seas than in any other place, particularly to the northward of the equator, from the coast of Africa to the eastern side of the Bay of Bengal; also in the China Sea, but with somewhat less regularity in the northern part of it. Monsoons.

The principal cause of these winds is the situation of the land as connected with the course of the sun; for the extensive coasts of Arabia, Persia, India, &c., being greatly heated when the sun is vertical to them, the atmosphere becomes rarefied there, and a S.W. wind blows from the ocean towards the land to restore the equilibrium. This current of air proceeding from the ocean, being highly charged with moisture in the state of gas, is gradually condensed into rain, which descends in great quantities upon the coasts of India that front the ocean in a south-westerly direction. Their cause.

When the sun returns into the southern hemisphere, the atmosphere there becomes greatly rarefied, and, by evaporation and cold winds from the northward, the land on the North side of the equator soon parts with its heat, and the atmosphere over it becomes dense; a N.E. wind or monsoon is then produced in North latitude, blowing towards the heated parts about the equator. This is the dry season on the coasts of India, for the wind blowing from the land brings fair weather; and the rainy season is produced by the wind blowing from the ocean towards the land, which is generally the case on both sides of the tropics.

Were there an extensive tract of land near the southern tropic in the Indian Ocean, probably a regular N.W. and S.E. monsoon would alternately prevail between that tropic and the equator, similar to the N.E. and S.W. monsoon, in North latitude. This we may suppose would be the case, for although the N.W. monsoon in the open sea seldom extends beyond lat. 8° or 10° S., yet in the vicinity of the East coast of Madagascar and the N.W. coast of New Holland, that monsoon extends several degrees farther to the southward, by the land being greatly heated when the sun is near the southern tropic.

Seasons and places in which they prevail.

The S.W. monsoon prevails from April to October, between the equator and the tropic of Cancer, and it reaches from the East coast of Africa to the coasts of India, China, and the Philippine Islands; its influence extends sometimes into the Pacific Ocean as far as the Marian Islands, or to about lon. 145° E., and it reaches as far North as the Japan Islands. In the same season, a S.S.W. monsoon prevails to the southward of the equator in the Mozambique Channel, between the Island of Madagascar and the coast of Africa, which is occasioned by the conformation of the lands on each side of that channel.

S.W. Monsoon.

N.E. Monsoon.

The N.E. monsoon prevails from October to May, throughout nearly the same space as that mentioned above; but the monsoons are subject to great obstructions from land; and in contracted places, such as Malacca Strait, they are changed into variable winds. Their limits are not every where the same, nor do they always shift *exactly* at the same period.

N.W. Monsoon.

The N.W. monsoon prevails between the N.E. part of Madagascar and the West coast of New Holland from October to April, and it is generally confined between the equator and 10° or 11° of South latitude, but subject to irregularities. This monsoon seldom blows steadily in the open sea, although in December and January it generally prevails, and in these months sometimes extends from lat. 10° or 12° S. across the equator to lat. 2° or 3° North. This is the rainy monsoon to the southward of the equator, and the S.E. monsoon is the dry season.

S.E. Monsoon.

The S.E. monsoon predominates from April to October in the space last-mentioned, and in some places reaches the equator, when the sun is near the northern tropic; but this monsoon may be considered as an extension of the S.E. trade following the sun, and when that luminary returns to the southern tropic it recedes to lat. 10° or 12° S.

The parts where the N.W. and S.E. monsoons prevail with greatest strength and regularity are in the Java Sea, and from thence eastward to Timor, amongst the Molucca and Banda Islands, and onward to New Guinea.

Westerly winds.

Westerly winds are sometimes experienced near the equator, in the Pacific Ocean, a great way to the eastward of New Guinea; and also in the Atlantic Ocean, westerly winds at times occur near, or a little to the northward, of the equator, forming a counter current to the regular N.E. and S.E. trade winds which prevail on each side of it.

VARIABLE WINDS prevail in both hemispheres from lat. 28° or 30° to the Poles, but those from West and W.S.W. generally predominate in North latitudes; and those from West and W.N.W. predominate in South latitudes. Variable winds.

The prevalence of westerly winds in high latitudes has been thus accounted for. The upper parts of the atmosphere having a motion towards the Poles, contrary to the trade winds, and becoming condensed beyond their limits, descend to the surface of the earth or sea; thus producing the motion from the West towards the East, to restore the equilibrium which has been destroyed by the trade winds. Immediately beyond the limits of the trade winds, the westerly winds are generally found to prevail.*

These westerly winds, in high latitudes, are liable to obstructions and changes from various causes, the influence of the sun being mutable and uncertain in the Temperate Zones; but beyond the Arctic and Antarctic Circles, where a settled frost and cold atmosphere constantly prevail, strong gales and sudden shifts of wind are not so liable to happen as at a greater distance from the Poles.

The sun's presence in either atmosphere has great influence upon the prevailing westerly winds in high latitudes; in the Northern Atlantic Ocean the wind generally inclines to W.S.W. in the summer months; and in winter, almost constantly to W.N.W. between the coasts of Newfoundland and Ireland. In the British Channel easterly winds often prevail in February, March, April, and part of May; during the other months, westerly winds prevail greatly.

On the N.W. coast of America south-westerly winds prevail in the summer months; and northerly winds during winter.

In the southern hemisphere, during the summer months, when the sun is near the tropic of Capricorn, the winds are sometimes very variable, but prevail at West and W.N.W. In the winter months they blow mostly from W.S.W. and West, and sometimes from South or S.E. Westerly winds prevail off the Cape of Good Hope, Cape Horn, and Cape Van Diemen, particularly when the sun is near the tropic of Cancer; but on the western coasts which form these promontories, the wind frequently prevails from the southward, when it is blowing strong from the westward off their extremities. And south-easterly or southerly winds are *generally* found to prevail more than any other, in February, March, and part of April, in the vicinity of those headlands.

LAND AND SEA BREEZES may be considered as a kind of alternating winds, which are generally experienced in settled weather upon coasts or islands between the tropics. They arise from the circumstance of land being a better conductor of heat than water, and consequently being susceptible of a higher degree of temperature by the action of the sun than the sea: this increase of temperature during the day rarefies the incumbent atmosphere, and a current of colder air rushes in from the sea to supply the deficiency, and forms what is called a *sea-breeze*. The progress of this breeze is regressive upon the sea, as it commences close to the shore where the motion of the air first inclines to the land, and then gradually extends out to sea; so that Land and Sea breezes.

* Col. Reid, speaking of Storms in high latitudes, says, "It has been shewn that the hurricanes which originate within the tropics, increase in diameter and diminish in force as they proceed towards the poles; and as the meridians approach each other, the gales may become huddled together. They may, therefore, frequently neutralize each other and become irregular. Their force, too, may often fall off, until the strength of the wind on that side of the circle where it blows from East is unable to reverse the regular westerly atmospheric current, and to convert it into a temporary easterly gale; and this may be the reason why easterly storms are less frequent in both hemispheres in the latitudes within which Great Britain is situated."—*Law of Storms*, p. 368.

vessels close in with the shore get the regular breeze sooner than those which are in the offing.

After sun-set, the atmosphere over the land becomes cool by evaporation ; and at whatever time of the night it exceeds in density that over the sea, the air takes a motion from the land towards the more rarefied parts over the sea, producing what is called the *land-breeze.* This is a progressive breeze upon the sea, as it begins on the shore, and gradually extends to seaward ; and its approach may be sometimes known by an increased noise of the surf.

These land and sea breezes extend in some places only to a small distance from the shore; but on the Malabar Coast, in the fair season, where they prevail *probably* with greater regularity than on any other part of the globe, their influence is perceptible at the distance of 20 leagues from the land.

When the land is greatly heated, and the evaporation not sufficient to cool the atmosphere over it below that of the adjoining sea, there will be no land breeze, and in such case the wind blows mostly from seaward; this may be observed in the Temperate as well as in the Torrid Zone.

During summer in England, when the weather is settled and serene, a gentle breeze from the sea frequently rises and increases with the altitude of the sun ; it is strongest after noon, when the air over the land is greatly rarefied, and it declines with the setting sun. The evaporation from the land during the night being in this country not sufficient to cool the atmosphere over it, below that of the adjoining sea, a land breeze is consequently seldom experienced in the night.

The temperature of the atmosphere being nearly the same over the land and sea, calms generally prevail in the night, until the sea-breeze returns, when the atmosphere over the land becomes heated by the sun in its diurnal course.

Squalls.

SQUALLS are generally of *three* kinds ; that called the ARCHED SQUALL is frequently experienced, and is usually distinguished by the arched form of the clouds near the horizon, but sometimes it assumes the appearance of a dense black cloud, particularly when highly charged with rain or electric matter. From the time that the arch or cloud is first seen above the horizon, its motion is sometimes very quick to the zenith, the interval being scarcely sufficient to allow a ship to reduce the necessary sail before the wind reaches her, which happens when the cloud has approached to the zenith. At other times, the motion of the cloud is very slow, and not unfrequently it disappears, or is dispersed, the impulse of the wind being then not sufficient to reach a ship. As a general rule, it may be observed, that if there be rain in these squalls preceding the wind, the latter will probably follow the rain in sudden severe gusts ; whereas, if the wind precedes the rain, the squalls are seldom so furious, and terminate in moderate showers of rain. This general rule, however, is often interrupted by the operation of local causes. THE DESCENDING SQUALL is not so easily discerned as the former, because it issues from clouds which are formed in the lower parts of the atmosphere near the observer; and when clouds are thus formed, they generally produce showers of rain and successive squalls of wind.* THE WHITE SQUALL is not often experienced ; but it sometimes happens near, or within the tropics, particularly in the vicinity of mountainous land. This squall generally blows very violently for a short time, and as it is liable to happen when the weather is clear, without any appear-

* This cloud is called the *Nimbus* by Meteorologists, who have distinguished all the various aspects of the clouds by appropriate names ; although this classification is not yet adopted by seamen.

ance in the atmosphere to indicate its approach, it is consequently very dangerous. The only mark that accompanies it is the white broken water on the surface of the sea, which is torn up by the force of the wind.

Squalls, and also storms, are sometimes progressive, at other times regressive, when obstructed by an opposite wind, or according as the point of greatest rarefaction is situated, as may be seen in the description of the sea-breeze.

When a squall is opposed by an opposite wind, its motion is greatly retarded thereby, and a ship sometimes in this case outruns the squall, and overtakes other ships which are within the limits of the opposite wind.

Progressive winds, when they have an opposite wind to subdue, are frequently preceded many hours by a swell, which extends a great way before them.

Winds in straits or channels.

In straits or channels formed between high lands, strong winds generally blow directly through them; this is experienced in many parts of the eastern seas, such as the Straits of Shadwan in the Red Sea, the Mozambique Channel, Straits of Macassar and Lombock, also in the entrance of the River St. Lawrence in North America, and frequently in the Frith of Forth in Scotland, although the latter is not bounded by *very* high land.

Winds over shoals.

In many places between the tropics, where shoal coral banks shoot up out of deep water, a decrease of the prevailing wind is frequently experienced upon them; for when a steady wind is blowing over the surface of the deep water, no sooner does a ship get upon the verge of a shoal coral bank, than a sudden decrease of wind is often perceived. This is probably occasioned by the atmosphere over these banks being less rarefied, and cooler, by the increased evaporation, than that over the deep water; consequently not requiring so great a supply of air to restore the equilibrium, as the circumjacent parts which are more rarefied and heated. Water, in small quantities, parts quickly with its heat, but retains it when in large quantities; in other words, the quantity of water evaporated and the cold generated in a given time is always in proportion to the extent of surface and the depth of the evaporating mass: the evaporation, therefore, over shoal banks is always greater than over deep parts of the sea, and the atmosphere, as well as the surface of the water, proportionally cooler over the former than over the latter.

Storms.

STORMS may be classed under three heads; GALES OF WIND, HURRICANES, and WHIRLWINDS.

Gales of wind.

GALES generally happen beyond the tropics, outside of the limits of Trade Winds; for in high latitudes, gales of wind, or storms, blow sometimes from one direction several days together, particularly during winter. These strong gales prevail mostly from the westward, and they are not so liable to shift round suddenly as the storms near the tropics; this, however, sometimes happens, and has occasioned the loss of many ships in the Atlantic Ocean, having their square sails set, and consequently not prepared for a sudden change.

The gales of wind which happen near and within the tropics are generally of short duration, and liable to veer round suddenly to an opposite direction.

Hurricanes.

HURRICANES are seldom experienced beyond the tropics, nor nearer to the equator than lat. 9° or 10° North or South: they rage with greatest fury near the tropics in the vicinity of the main land or islands; far out in the open ocean, they rarely occur; and when they happen within 10° of the equator, they generally are less violent than nearer to the tropics.

These are dreadful tempests, in which the wind shifts sometimes suddenly from one direction to the opposite, raising the sea in pyramids; its violence is frequently so great as to overcome all resistance, breaking the masts of ships, and tearing up trees by the roots. The velocity of the wind in some violent hurricanes has been estimated about 80 or 90 miles an hour: in a pleasant brisk gale it is about 20 miles an hour. In some places, hurricanes are occasionally accompanied by an earthquake.

Hurricanes happen among the West India Islands, near to the East coast of Madagascar, near the islands of Mauritius and Bourbon, and to the eastward of these islands, within the limits of the S.E. trade: they are also liable to happen near the coasts of India, particularly in the Bay of Bengal at the changing of the monsoons.

They are called Ty-foongs by the Chinese, and frequently happen on and near the coasts of China, extending from thence to the eastward of Luconia, and to the north-eastward as far as the Japan Islands. A description of them will be found in Volume Second of this Work, in the First Section, under the title "China Sea:" and the hurricanes which happen near the islands of Mauritius and Bourbon are described in the section where directions are given for the returning passage from India towards the Cape of Good Hope.

Whirlwinds and water-spouts.

WHIRLWINDS are sometimes occasioned by high uneven land: when the wind is blowing strong, gusts from the mountains descend sometimes with a spiral or whirling motion upon the surface of the contiguous sea. But the phenomenon usually known by the name of WHIRLWIND when seen upon land, and called a WATER-SPOUT when it happens at sea, is generally attributed to electrical causes; as it occurs mostly in warm climates, when black dense clouds appear low in the atmosphere, which, being highly charged with electric fluid, thunder or lightning is mostly experienced with a whirlwind; and at sea, it is almost invariably accompanied by rain or hail.

When a water-spout is forming at a small distance, a portion of a dense cloud is observed to descend and stretch itself towards the sea in a conical shape; at the same time the surface of the sea immediately under it is agitated, and ascends a little way in the form of steam or white vapour, from the centre of which a small cone proceeding upwards unites with that projected from the cloud; the water-spout is then formed: frequently, however, the acting cause is not adequate to its completion, in which case the half-formed water-spout soon disperses.

There is in the middle of the cone that forms a water-spout a white transparent tube or column, which, when viewed at a distance, seems like a stream of water ascending, and gives it a very threatening aspect; but when closely approached, this partly vanishes. I have passed close to several water-spouts, and through the vortex of some that were forming, and was enabled to make the following observations:

By an electrical force, or *ascending* whirlwind, a circular motion is given to a small part of the surface of the sea, in which the water breaks, and afterwards acquires a whirling motion with a velocity of 2, 3, to 4 or 5 knots. At the same time, a considerable portion of the water in the whirlpool is separated from the surface in minute particles, resembling smoke or vapour, accompanied by a hissing noise from the strength of the whirlwind; these particles continue to ascend with a spiral motion to the impending cloud. In the centre of the water-spout there is a vacuum,* in which none of the small particles of water ascend; and in this, as well as around the outer edges of the

* "Probably a calm. If it were a vacuum, the water would rise and fill it."—*Col. Reid's "Law of Storms,"* p. 10.

water-spout, large drops of rain fall, because in those places the power of the whirlwind is not sufficient to support the ascending particles.

The vacant space in the centre of the water-spout seems, when viewed at a distance, to be that which has a white transparent appearance, like a column of water, or a hollow glass tube. In calm weather, water-spouts are generally perpendicular, but occasionally they have an oblique or curved direction, according to the progressive motion given them by the prevailing winds. Sometimes they disperse suddenly, at other times they move rapidly along the surface of the sea, and continue a quarter of an hour or more before they disappear.

Water-spouts are seldom seen in the night; yet I once passed near to a large one in a cloudy dark night. The danger from water-spouts is not so great as many persons apprehend, for it has been said, that when they break, a large body of water descends sufficient to sink any ship. This does not appear to be the case, for the water descends only in the form of heavy rain, where it is broken from the ascending whirlwind; but there is danger in small vessels of being overset when carrying much sail, and large ships, if their top-sails are not clewed up and the yards secured, may be liable to have them carried up to the mast-heads by the force of the whirlwind, and thereby lose their masts. It is sometimes thought, that the firing of a gun when near a water-spout will break it, and effect a dispersion; the concussion produced in the atmosphere by the explosion destroying in such case the cohesive force of the whirlwind. In the vicinity of water-spouts, the wind is subject to fly all round in sudden gusts, rendering it prudent for ships to take in their square sails.

When a whirlwind happens on land, all the light substances on the surface of the earth within its course are carried up in a spiral motion by it. I have observed one pass over Canton River, in which the water ascended like a water-spout at sea, and some of the ships that were moored near its path were suddenly turned round by its influence. After passing over the river, it was observed to strip many trees of their leaves, which, with the light covering of some of the houses or sheds, it carried up a considerable way into the atmosphere.

THE MARINE BAROMETER is a very useful instrument, especially in high latitudes, in assisting navigators to anticipate approaching storms: previous to a hard gale of wind, there is generally a great fall of the mercury, and even near the tropics the fall of it before a storm or hurricane is usually considerable. Within 9° or 10° of the equator, there seldom or never is a hurricane or storm of long duration, but whirlwinds, and hard squalls of a few hours' continuance, are sometimes experienced within these parallels, without any fall of the mercury. Indeed, the barometer is of little use as a guide in prognosticating storms which may happen within the tropics; except that before a severe hurricane there is often a considerable fall of the mercury, when the latitude is not less than 14° or 15° North or South.* Marine Barometer.

In high latitudes, the motion of the mercury in the barometer, like the winds, is mutable and uncertain; but previous to a storm or gale of wind, there is commonly a great fall, and the mercury begins to rise before the conclusion of the gale, sometimes even at its commencement, as the equilibrium in the atmosphere begins to be restored.

Although the mercury sinks lowest before high winds, it frequently sinks considerably

* I have engraved an atmospherical register for facilitating the use of the Marine Barometer; by exhibiting its monthly range in each of the 12 sheets which the register contains, with an introductory sheet by way of example: this register is constructed for a period of 3 years, and is much more convenient than the usual method of registering the height of the mercury by cyphers.

before a heavy fall of rain; and when the mercury stands low, the air is light and deprived of expansibility or elasticity, therefore not capable of supporting much gaseous moisture; at such periods, consequently, rain generally falls. The mercury also sinks on the approach of thunder and lightning, or when the atmosphere is highly charged with electric matter.

In serene settled weather the mercury commonly stands high, also in clear frosty weather. The mercury, in the open sea, is in general inclined to rise with easterly, and fall with westerly winds. It is likewise necessary to remember, that in the northern hemisphere, in the open sea, the mercury rises with northerly and falls with southerly winds; because, the former coming from the frozen parts near the pole, are more dense than the latter, which blow from the equatorial regions. In the southern hemisphere, the contrary takes place, for there the mercury rises with the cold southerly winds and falls with northerly winds. These effects are more particularly observed in high latitudes in the ocean, for obstructions and irregularities will always happen near land; because there, the rarefication and expansibility of the atmosphere are not so equal as over the ocean.

After very warm and calm weather, in winter particularly, a storm is likely to follow; or at any time that the atmosphere is greatly heated above the medium temperature.

Atmospheric tides.

It is proper to observe, that in the open ocean between the tropics, in settled weather, there is a *flux* and *reflux* in the atmosphere *twice* every 24 hours, resembling the tides of the sea; but these atmospheric tides depend upon the sun's influence and the rotation of the earth, and do not follow the motion of the moon. The rise and fall of the mercury, in consequence of these tides, is about 6 or 7 hundredths of an inch, in settled weather, near the equator; the high station happening about 11 o'clock in the morning and 11 o'clock at night, and the low station about 5 o'clock in the morning and evening. The regularity of this flux and reflux of the atmosphere is obstructed by land, but in the ocean it prevails to lat. 26° North and South; and in fine steady weather it may be perceived as far as lat. 30° or 32° North or South.* Exclusive of the change in the barometer caused by the diurnal atmospheric tides between the tropics, Sir John Herschel, in his voyage to the Cape of Good Hope in November and December 1833, observed a permanent depression of the mercury, especially at or near the equator, below what exists beyond the tropics in both hemispheres,—and the quantity of this permanent depression he estimated at two-tenths of an inch.

By proper attention to the marine barometer, the experienced navigator may often be enabled to anticipate the changes of weather: and in some seas, he may by its indications even take in or let out reefs in the night. It is also advisable to observe the phases and progress of the moon, for it is reasonable to suppose the influence of that planet upon the atmosphere must be considerable, in penetrating through it to the surface of the ocean.

* An abstract of 22 months' observations with two marine barometers is recorded in the Philosophical Transactions of the Royal Society for 1805, wherein I have described more fully this flux and reflux of the atmosphere in different parts of the globe, from actual observation.

The influence of the atmosphere upon the mercury in the barometer, may perhaps be partly attributed to the expansible force of the air, as well as to the pressure arising from its gravity. If a barometer be placed near the perpendicular side of a high hill, wall, or building, when the wind is blowing violently against it, the mercury will *probably* remain nearly at the same height as if the barometer stood in an open place; but the density or gravity of the atmosphere ought to be considerably augmented by compression near the wall, on account of the obstruction it presents to the velocity of the wind; consequently the mercury should be more elevated in a barometer placed there, than it would be were it fixed in an open situation at the same time, if the action of the atmosphere upon the mercury were solely the force arising from its gravity.

THE CHANGE of the MOON, in most parts of the globe, is more likely to be accompanied by stormy weather than the full moon; and blowing weather prevails more in dark nights than when much of the moon's disc is illuminated. By looking into the Nautical Almanac the lunar points will be seen. When the semi-diameter and horizontal parallax of the moon are greatest, she is in that part of her orbit nearest the earth, called the Perigee; and when the semi-diameter and horizontal parallax are least, she is in that part of the orbit farthest from the earth, called the Apogee.

Supposed influence of the moon upon the atmospheric tides.

An ingenious Frenchman has given a table of the chances of the changes of weather likely to happen at the lunar points, which he makes 10 in number. The principal of these lunar points are Perigee, Apogee, Change, and Full; and the changes likely to happen with these points, he thus marks:

The Perigee of the moon is likely to be accompanied by the greatest changes which happen from a *single* lunar point.

The new moon, next to the Perigee, is likely to be accompanied by the greatest changes of weather.

At new moon coinciding with the Perigee, the greatest changes may be expected, or 33 to 1 that a change of weather happens.

New moon coinciding with the Apogee, 7 to 1 that a change happens.

Full moon coinciding with the Perigee, 10 to 1 that a change happens.

Full moon coinciding with the Apogee, 8 to 1 that a change happens.

If new moon and Perigee coincide, when the sun is on the equator, the chance of a change of weather must be great.

If with the autumnal equinox, any of the lunar points coincide, there will be a great chance of a Ty-foong on the South coast of China, or of a storm in other parts near the tropic of Cancer.

The changes of weather do not happen precisely at the lunar points, but, like the tides, vary a little in time from these points; for a change of weather often precedes 1 or 2 days the change of the moon.

THE VELOCITY of the WIND may be measured in various ways. An easy and tolerably correct method is by estimating the motion of the detached clouds, when they are passing near the surface of the earth; for in such case, their velocity will be nearly, though probably not quite so great as that of the wind. So that by measuring the interval of time betwixt the passage of the shadow of a cloud over two places, and comparing it with the distance between them, the velocity of the clouds moving with the current of wind may be ascertained.

Velocity of the wind.

This may be done at sea when two ships are at a considerable distance from each other in the direction of the wind, and sailing at the same rate on the same course: when the shadow of a cloud passing under the sun is observed to darken the sails of one ship, the time may be noted by a watch, and when the shadow of the same cloud darkens the sails of the other ship, the time ought also to be marked. The distance between the ships may be measured by sound, one of them firing a gun by signal, that the other may be enabled to note the time which elapses from seeing the flash to hearing the sound; the number of seconds in this interval multiplied by 1140, the number of feet which sound moves in a second, will give the distance in feet between the ships.*

* Experiments made by Mr. Millington make the velocity of sound to be nearest 1130 feet in a second, accelerated or retarded *a little*, by the direction of the wind; but the state of the barometer made no difference in its velocity. Dr. Olinthus Gregory, by various and numerous experiments, has found the velocity of sound to be 1100 feet per second at the temperature of freezing or 33°, and 1116 at the temperature of 66°;

If the two ships are near each other, and the height of their mast-heads is known, the angle of one of their mast-heads may be measured by sextant, and these elements of a right angled triangle used to obtain the distance between them; which cannot be correctly ascertained by sounds, unless they are at a considerable distance from each other. In measuring the velocity of the wind by the motion of the clouds, the mean of several observations ought to be taken.

The velocity of the wind may also be measured on shore pretty correctly, by means of a common kite. This is effected by letting the kite run out a certain length of loose line, and marking the time it takes in passing through the hand by watch; then the time compared with the quantity of line run out will give the velocity of the wind nearly, but rather less than the truth: because the kite having a line fixed to it, and descending by its gravity, will be a little retarded in its horizontal motion.

Waves of the sea.

THE WAVES of the SEA are in general governed by the wind, and move in the same direction, when the latter has continued steady for a considerable time; but this regularity of the waves is often interrupted by local causes. Sometimes the waves run contrary to the wind; at other times they are seen moving in various directions, running into, and crossing each other at different angles. During light winds, when a strong current is prevailing, there is generally a short confused swell in the opposite direction to the current, by attending to which experienced navigators may often foretell the course of the latter.

Their velocity.

There is reason to think, that few observations have been made at sea relative to the velocity of the waves, which is generally greater in the ocean than in shoal water near land; because here, the mixed particles of sand and mud, and the friction occasioned by them and the ground, must considerably retard the regular progress of the waves.*

The velocity of the waves may be easily measured by the common log, when a ship is running with them. To do this, when there is several knots of line out, or after the log is hove to obtain the velocity of the ship, mark the time to the nearest second by watch when the log is lifted upon the top of any wave, and mark the time when the stern of the ship is lifted up by the same wave: the length of line between the stern and the log will be the measure of the apparent velocity of the wave for the interval of time, to which must be added the velocity of the ship, and the sum will be the *true* velocity of the wave.

It may also be measured, when 2 ships, or a boat and a ship, near each other, are sailing on the same course with equal velocity, or when they are stationary during a calm. This is done by taking the angle of one of the ship's mast-heads with a sextant, the height of it being known from the deck or above the surface of the sea, and correction must be made for the height of the eye above water. In this right-angled triangle, the perpendicular or height of the mast and the angles are given, to find the horizontal base line or distance between the ships, as in the case mentioned above, for ascertaining the velocity of the wind. At the time the angle of the ship's mast-head is taken, mark the time when the first ship is lifted up by a wave, and also the time when the other ship is lifted up by the same wave, and the distance between them, if they are both in a line with the course of the waves, will be the measurement of the velocity

therefore deduct $\frac{1}{2}$ a foot from 1100 for every degree below 33°, and add $\frac{1}{2}$ a foot for every degree of higher temperature.

* Dr. W. H. Wollaston found the velocity of the waves to be nearly 60 miles an hour by some observations taken at anchor in one of the Leith Smacks, close to the east coast of England. Captain David Thomson, an officer possessing much science, found the velocity of the waves to be 30 miles per hour, by repeated trials, when sailing directly before the wind with a strong gale, off the Cape of Good Hope.

of that wave for the interval of time. In order to approximate to the truth, the mean of several observations should be taken; the velocity of the waves may be measured in this manner, although the two ships are not in a direct line with the course of the waves, by taking the angle between this course and one of the ships. In such case, the distance between the ships will be the hypothenuse of a right-angled triangle, which, with the angles, are given, to find the opposite side or perpendicular; and this will be the measurement of the velocity of the waves, for the interval of time marked by watch.

These methods of measuring the velocity of the winds and waves are stated principally with the view of exciting young navigators to rational amusement during a leisure hour; and that they may, by practice, improve themselves in the knowledge of maritime surveying, so essential to skilful navigators.

THE LUMINOUS APPEARANCE of the SEA,* which frequently happens, more particularly between the tropics, or near them, in different parts of the globe, is produced from various causes, not generally known to navigators; although it has been noticed by Aristotle and Pliny, and by several naturalists in different ages, since their time. Luminous appearance of the sea.

Of various kinds of marine animals which emit light, the following appear to be best known.

First.—The Cancer Fulgens, discovered by Sir Joseph Banks, resembling the common shrimp, but smaller; this I have often seen sparkling at the edge of the sea in dark nights, during the S.W. monsoon, on the Malabar Coast; and after being carried in a handful of sand, to be examined with a microscope, it continued to emit light till life was extinct.

Second.—Limulus Noctilucas, discovered by me in the Arabian Sea, April 12th, 1798. Perceiving several luminous spots in the sea after day-light, and supposing them to be animals, I went in the boat and caught one, with some difficulty, as it endeavoured to avoid my hand. It proved to be an insect somewhat resembling in appearance the wood-louse, and was about $\frac{1}{3}$ of an inch in length; on examination with the microscope, it appeared to be formed by sections of a thin crustaceous substance, and while any fluid remained in the animal, it shone brilliantly like the fire-fly.

Third.—The Medusa Pellucens (or one of the species of blubber-fish), discovered by Sir Joseph Banks to be luminous, is a zoophyte, the most splendid of the luminous inhabitants of the ocean: the flashes of light emitted during its contraction are at times so vivid, as to affect the sight of the spectator.

Several other species of luminous medusæ were discovered by Mr. Macartney, on the coasts of Kent and Sussex, of various forms and sizes, some of them very minute, not larger than the head of a small pin. Forster and other naturalists, have also discovered several different kinds of luminous marine animals besides those already mentioned.

Although the luminous appearance of the sea is generally produced by living animals, nevertheless, some kinds of dead matter seem to give it a similar aspect at times, such as the exuviæ of fishes or putrefactions.† I have sometimes carefully examined

* An excellent paper on luminous marine animals, by J. Macartney (Professor of Anatomy at the University of Dublin), was published in 1810 in Part 2nd of the Philosophical Transactions of the Royal Society of London.

† Putrid fish are known to shine in the dark; this I have seen strangely exemplified at Bombay, where great quantities of a glutinous species of fish, resembling white-bait, are caught, and spread on the fields to be dried by the sun. These had a novel appearance in dark nights, the whole extent of the ground exhibiting a continued sheet of shining light.

the water of the sea when it was luminous, and could not discern any animation, but it appeared only to contain small particles of matter of a *dusky straw colour*, which dissolved with the slightest touch of the finger; at other times the sea was evidently illuminated by small sparkling animals.

A peculiar phenomenon is sometimes seen in the Banda Sea, and other parts of the Eastern Seas; and particularly in the Arabian Sea, between the east coast of Africa and the coast of Malabar, during the rainy monsoon. This I had an opportunity of once observing at midnight, when the weather was cloudy, and the sea particularly dark, but it suddenly changed to a white flaming colour all round. This phenomenon bore no resemblance to the sparkling or glowing appearance observed on other occasions in seas near the equator, but the sea was of a splendid colour, white as milk, which did not continue more than ten minutes, when it resumed its former darkness.

This singular phenomenon has been also observed by several persons near the Malabar Coast, and in other parts, and it appears to be in a great degree elucidated by the observations of Mr. Langstaff, made in a passage from Port Jackson toward China. About half an hour after sun-set, the sea changed to a milky appearance, and the ship seemed to be surrounded by ice covered with snow. A bucket of water being hauled up, and examined in the dark, a great number of globular bodies were discovered, *linked together*, each about the size of a pin's head, the chains thus formed did not exceed three inches in length, and emitted a pale phosphoric light. This extraordinary appearance of the sea was visible two nights; but as soon as the moon exerted her influence, the sea resumed its natural dark colour, and exhibited *distinct glittering spots*, as at other times. Mr. Langstaff's observations seem to shew, that the diffused light of the sea is produced by an assemblage of minute medusæ on the surface of the water.

Mr. Macartney has seen streams of light on the surface of the sea, at different times, on the southern coasts of England; and upon examination, a gallon of sea water in a luminous state, after being strained, left above a pint of small medusæ He has also under such circumstances, perceived the sea to yield more support in swimming, and the water to taste more disagreeably than usual.

The surface of the sea is usually more subject to be luminous after long calms and sultry weather than at any other time; for then, it abounds with minute medusæ and small marine animals generated in calm weather, which render it fœtid both to the smell and taste. At such times the sea becomes easily illuminated, by the least disturbance of a squall, or any thing that produces agitation or friction on its surface. The porpoise, dolphin, dorado, and other fishes, therefore, often reflect a vivid light when swimming near the surface, which has induced some persons to ascribe the property of emitting light to several fishes: but upon close examination, the bodies of those fishes were found to be covered with minute spherical particles which adhere to their surface, apparently the same that illuminated the whole of the sea at the time, and in all probability were a minute kind of medusæ.

The small particles of matter of a dusky straw colour, mentioned above, which were examined by me (but not with a microscope), and appeared destitute of animation, might nevertheless have been the minute medusæ discovered by Mr. Macartney, and called by him Medusa Scintillans, which he thinks to be the most frequent cause of the luminous appearance of the sea. When at Herne Bay, a small watering place on the northern coast of Kent, in October 1804, he observed the sea to be luminous several nights, and took up a considerable quantity of the water, which emitted no light when at rest; but on the slightest agitation of the vessel which contained the

water, a brilliant scintillation was perceived towards the surface ; and when the vessel was suddenly struck, a flash of light issued from the top of the water, in consequence of so many points shining at the same moment. Having strained a quantity of the luminous water, a great number of transparent corpuscles were obtained upon the cloth, and the water which had been strained did not afterwards exhibit the least light. Some sea water, which had been rendered particularly clear by repeated filtrations, was then put into a large glass, and having floated in it a fine cloth, on which he had previously collected a number of luminous corpuscles, several of them were liberated, and became distinctly visible in their natural element, by placing the glass before a piece of dark coloured paper. They were observed to have a tendency to come to the surface of the water, and after the glass was kept steady sometime, they were found congregated together, and when thus collected in a body, they had a *dusky straw colour*, although individually they were so transparent as to be invisible, except under particular circumstances. In the air, they appeared like globules of water; they were more minute than the head of the smallest pin, and upon the slightest touch they broke and vanished from the sight. The motions of these creatures in the water were slow and graceful, not accompanied by any visible contractions of their bodies ; and after death they always subsided to the bottom of the vessel.

A beautiful illumination of the surface of the sea is sometimes reflected from the broken water or waves at the head of a ship, occasioned by her velocity through the fluid, when it abounds with those animals which emit light. Once I experienced a splendid instance of this kind near the equator, when the quantity of gleaming light reflected from the waves under the weather bow of the ship, against the white fore-sail, was sufficient to enable me to read any pages of a book, if not printed with a very small type, although the night was otherwise dark at the time.

Temperature of the sea.

THE TEMPERATURE of the SEA is a phenomenon hitherto but little investigated, although it appears to be closely connected with the improvement of nautical science ; the following observations may, therefore, be not altogether unimportant to navigators.

It has been thought that the temperature of the ocean was subject to little variation, particularly between the tropics; the temperature of its surface, however, is affected by changes of the superincumbent atmosphere, as well as by other local or adventitious causes.

1st. When the atmosphere has a low temperature, a portion of its cold is imparted to the surface of the ocean, by which the temperature of the water is diminished.

2nd. Tempestuous weather raises the temperature of the sea, an effect which is *probably* produced by the agitation or friction of the broken waves, the particles of water rubbing against each other.

3rd. Currents have a more powerful influence than any other cause in changing the temperature of the surface of the ocean ; and it may be here observed, that the same rule is applicable in this case as that already stated in regard to winds, under the articles *Trade Winds* and *Marine Barometer*, viz.: That in either hemisphere a current proceeding from the cold polar regions towards the equator, diminishes the temperature of the sea ; whereas, a current running from the inter-tropical regions towards either pole, raises its temperature. It is surprising how long the great bodies of currents preserve their original temperature ; that known by the name of the Gulf Stream loses only two degrees of its original warmth in running 1300 miles into a cooler climate, it being 81° in summer in lat. 39° N. ; and in passing the bank of Newfoundland,

it is several degrees warmer than the sea in its vicinity; thus the experienced navigator is enabled to ascertain when he gets into the Gulf Stream merely by drawing a bucket of water, and feeling its temperature.

4thly and lastly. The depth of the sea appears, also, to have a great influence on the temperature of its surface, for the immense body of water contained in the ocean preserves its heat: whereas, in places of little depth, the surface of the water is cooled by increased evaporation.* The temperature of the ocean, therefore, may be expected to be higher than that in seas which have little depth of water, in the same parallels of latitude. This seems to be verified by the experiments and observations of Dr. John Davy, during his voyage to Ceylon; as in approaching the land of Table Bay at the Cape of Good Hope, from the westward, the temperature of the sea decreased 2°, and it also decreased 2° when the Island of Ceylon was closely approached, although the bank of soundings does not extend far out from either of these places.

Sir John Herschel in a letter, dated Cape of Good Hope, July 7th, 1834, states that from the time of leaving England, in November 1833, the temperature of the sea increased with regularity, until in lat. 4° N., lon. 21° 10′ W., where it attained its maximum, and on the average of six days' observations, about the 6th December, it was 81° of Fahrenheit. The temperature decreased, also, regularly, in proceeding from the equator to the southward, it being 64°, 2, on the 12th January, 1834, then in lat. 34° 16′ S., lon. 11° 49′ E. On the following day, the 13th, it rose to 70°, 5, in lat. 34° 35′ S., lon. 14° 42′ E., which was attributable to a part of the warm stream that sets round the Cape to the westward; as it decreased to 68°, 3 on the 14th, in approaching the land, and to 59°, 5 when Table Bay was entered, on the 15th of January 1834, which corresponds with other observations, that the temperature of the sea decreases in the proximity of land or shoal banks.

In calm and settled weather the temperature of the sea was found, by Dr. John Davy, to reach its maximum about one or two hours after noon; and its minimum about sunrise.

Were the temperature of the sea, as well as that of the atmosphere, conjointly registered in the journals of navigators, several times every 24 hours, it would assist greatly the improvement of nautical science; and the proximity of land or shoal banks, might *probably* be ascertained by carefully observing the temperature of the sea.

The late Captain J. P. Wilson, of the Company's ship Hythe, a very scientific officer, has ascertained by careful observation that the temperature of the *central* part of the stream of westerly current which prevails along the verge of Cape Aguilhas Bank, is about 8° or 9° higher than that of the sea beyond the limits of the stream of current; and as the maximum of temperature is in the middle of the stream of current, a ship may be kept in it, by attending to changes of temperature in the surface water, and thereby be enabled to accelerate her progress to the westward during adverse winds.

Currents.

CURRENTS, or TIDES, are generally experienced more or less in most parts of the ocean. Where trade winds or monsoons blow steadily, the current runs mostly with the wind; but at times, no current is experienced, and sometimes it sets contrary to the prevailing wind.

In high latitudes, in the open ocean, the current seldom runs so strong as in the vicinity of the equator, where it is very changeable, running in parts of the Pacific and Indian Oceans, sometimes at the rate of from 20 to 60 miles in 24 hours.

* See the sequel under the article *Squalls*, at p. vii.

The current near the equator, and also in most places of the open sea, sets more frequently to the westward than to the eastward: and when the current is running in one direction on the surface, it is sometimes running in an opposite, or oblique direction, underneath. Therefore the usual method of trying the velocity and direction of the current in a boat, by sinking a kettle or pot to the depth of 60 or 70 fathoms, is seldom found to agree with the admeasurement of the same by chronometers. But since navigation has been improved by the use of the latter, the direction and velocity of currents are now more correctly ascertained.

The tides, in high latitudes, generally rise and fall more than in low latitudes, and it has been said, that the perpendicular flux and reflux was very little within the tropics, which is not always the case. At the head of the Gulf of Cambay, in lat. 22° N., the perpendicular depth of the rise and fall of the tides is from 30 to 36 feet at the full and change of the moon. At the same time, it is 20 and 21 feet in Surat Road; and from 15 to 17 feet in Bombay Harbour. Tides.

In the Gulf of Martaban, which is far within the tropics, the perpendicular depth of the rise and fall of the tide, at the full and change of the moon, is 23 and 24 feet, and off Rangoon Bar about 20 or 21 feet.

In Gaspar Straits, within $2\frac{1}{2}$° of the equator, there is sometimes, from local causes, a rise and fall of 16 or 17 feet on the springs; but the rise and fall of the tide, is *seldom* so great as this, in places situated near the equator.

Although in most places, the tide flows twice every 24 hours, this is not universally the case within the tropics,* for amongst several of the eastern islands, the tide flows only once in 24 hours; the passage of the moon over the meridian generally makes high water at these places; but in some parts, the tide is highest when the moon is near, or in the horizon.

MAGNETISM is one of the phenomena of nature which seems to elude the definitions of science; several hypotheses, indeed, have been formed, and many attempts made to discover its elementary principles, yet they appear to be still very imperfectly known. Formerly some philosophers were of opinion, that a great central magnet in the internal part of our globe was the cause of all the magnetic influence; while others considered the cause to be merely atmospherical. But the productive cause of magnetism seems neither confined within the earth, nor to the atmosphere, as both are known greatly to affect the magnetic needle, and later discoveries have shewn its connection with electricity. Magnetism. Productive causes.

Many of the masses of rocks or mountains which form a considerable portion of the earth are partly composed of metallic matter, and exert a powerful magnetic influence.

The sun has an influence on the needle, producing a *diurnal* variation, which has been observed to increase progressively† with the altitude of that luminary.

The Aurora Borealis, which is considered to be an electrical phenomenon, is also thought to have an effect upon the magnetic needle; and it appears to be influenced by several other secondary causes.

Mr. John Churchman, an American, who was a member of the Imperial Academy Hypothesis of Churchman and Walker.

* In many places far beyond the tropics, the tide likewise flows only once in 24 hours, particularly on the southern coast of Van Diemen's Land; but at Port Dalrymple on the North coast, the tide flows twice in 24 hours.

† This I have experienced several times during fine weather at sea, in observing a series of azimuths; commencing when the sun's altitude was 3° or 4°, and continuing the observations until it was 25° or 30° above the horizon. The diurnal variation of the needle has been long known, and often observed upon land.

of Sciences, St. Petersburgh, and Mr. Ralph Walker, the civil engineer, formerly of Jamaica, appear to have published, nearly at the same time, an ingenious hypothesis, with a view of solving all magnetical problems, relating both to the vertical and horizontal declination of the needle. In a diagram of the two hemispheres, on the plane of the equator, drawn by Mr. Walker upon this principle, there are two magnetic poles, represented at different distances from the poles of the earth, and revolving round the latter in unequal periods of time. The North Magnetic Pole is placed for the year 1794, in lat. 71° N., lon. 80° W.; the South Magnetic Pole in lat. 65° S., lon. 130° E.; and by the intersections of the magnetic meridians with the terrestrial meridians, the variation of the needle might be found by inspection on these hemispheres for all places on the surface of the globe, were the positions of the magnetic poles well ascertained and correctly laid down, and the needle not subject to aberrations from various causes already mentioned. But exclusive of the perpetual aberration of the needle from *permanent* causes of nature, it is likewise subject to *adventitious* and *local* attractions, liable to operate in a considerable degree against the accuracy of any theoretical solutions.

Mr. Churchman supposes the periodical revolution of the North Magnetic Pole round the North Pole of the earth to be 1,096 years; and the revolution of the South Magnetic Pole round the South terrestrial Pole to be 2,289 years, its motion being much slower than that of the North Magnetic Pole, which is the cause of perpetual irregularities of the variation of the needle. He is of opinion, that when one of the Magnetic Poles is in the zenith of any place, *magnetic tides*, or great inundations, will there be experienced; and when the Magnetic Pole is far distant from any place, the sea will recede, and alluvial land will be formed. Mr. Walker, besides his diagram for showing the horizontal declination of the needle, has drawn two hemispheres on the plane of the equator, for shewing the vertical declination or dip of the needle for all places on the globe; and in addition to his improvements on steering compasses, he has invented a meridional compass for shewing the quantity of variation by inspection at any time of the day.*

The celebrated Dr. Halley was of opinion, that the variation and dip of the needle could not be resolved consistently, on the supposition of the earth having only one magnetic axis, and two magnetic poles; and he inferred, that two magnetic poles must exist in the northern hemisphere, and two also in the southern hemisphere of the earth, in order to account for the discordant magnetic changes.

Professor Hansteen, justly esteemed for his profound investigations of magnetical phenomena, and for his researches in Siberia and other places, to ascertain the magnetic influence and intensity, has discovered the existence of a magnetic pole in that country, Siberia, which leaves no doubt that there are two magnetic poles in the northern hemisphere: and as the late expeditions of our enterprising navigators have proved the existence of another magnetic pole in lat. 70° 5¼′ N., lon. 96° 46¾′ W., by the observations of Captain James Clarke Ross, Dr. Halley's inference seems to have been correct, and may soon be demonstrated by similar researches in the southern hemisphere, where the existence of two magnetic poles will probably be discovered.†

* The late Mr. J. Garnett, an ingenious philosopher and astronomer, who resided long in America, where he superintended the publication of an Astronomical Ephemeris, states that he used the common ring dial for the same purpose at sea as well as on land, which shews the *true* meridian within 1° of the truth, at any time when the sun's altitude is not too great; and consequently, the variation of the needle from the *true* meridian.

† A scientific expedition, consisting of H. M. ships Erebus and Terror, under the command of Captain James Clarke Ross, which sailed from England in October 1839, will, in all probability, throw much light on this point; the investigation of the phenomena of magnetism being the primary object of the expedition.

According to the recent researches of Professor Hansteen, the earth has four magnetic poles, all revolving in the neighbourhood of the geographic poles; and the periods of these revolutions are respectively about 4,600, 1,740, 1,300, and 860 years. These times, though long, as historical periods, are short, compared with many of those cycles of which geological researches and astronomical calculations seem to prove the existence.

THE VARIATION OF THE COMPASS, when mentioned in this work, is intended *only* for the navigator to make proper allowance in steering from one place to another, and not as a guide for estimating the longitude, which was practised about 30 and 40 years ago by mariners, before the use of chronometers and lunar observations became general. Variation of the compass.

In places where the variation changed quickly, in sailing nearly on a parallel of latitude, navigators were formerly eager to embrace its aid as an approximation to the true longitude; but compasses being subject to many errors from various causes, the longitude ascertained by means of the variation could never be trusted to with any reasonable degree of confidence. The variation of the needle is in a state of continued change in most places of the globe, and there is also a *diurnal* and *annual* variation of the variation; besides the same compasses will alter when taken from one ship into another, and if shifted to different situations in the same ship. And in some places of the globe, although a compass be stationary in a ship, the needle seems to be subject to an aberration of several degrees, proportionate to the angle that the ship's head makes with the magnetic meridian.

THIS ABERRATION OR LOCAL ATTRACTION OF THE NEEDLE, Captain Flinders constantly experienced during his survey of the coasts of New Holland, which is recorded in the Philosophical Transactions of the Royal Society for 1805. With the compass placed amidships in the Investigator, the bearing of points of land on the South coast of New Holland, taken immediately before and after tacking, differed sometimes 8° or 9° when the ship's head was changed nearly from East to West; but there was little or no difference when the direction of the ship's head was North or South. This difference in the direction of the magnetic needle from its *mean* state, was easterly when the ship's head was West, and westerly when it was East. When the ship's head was North or South, the needle continued in its mean state, and shewed a variation from the *true* meridian, nearly equal to the medium between what it shewed when the ship's head was East and when West; and the aberration of the needle was nearly proportionate to the number of points which the ship's head was from the North or South. Aberration or local attraction of the needle.

This aberration of the needle, arising from a change of the ship's head, varies in different ships at the same place, according to their size, and the quantity of iron they contain, and it appears to be greatest in small ships: but in places near the equator, where there is little variation, this aberration cannot be perceived, for it increases in proportion to the distance from the magnetic equator, toward the poles in both hemispheres.

Captain Flinders was of opinion, that the magnetism of the earth, and the attraction of the iron in a ship, acted as a compound force in producing the error of variation by the change of a ship's head; and he thought that *the error at any direction of the ship's head, would be to the error when her head was East or West*, at the same dip of the needle, *as the sine of the angle between the ship's head and magnetic meridian was to the sine of eight points, or radius.*

Since the time of Vancouver, Flinders, Bain, and others, alluded to by Captain Horsburgh, the subject of local attraction has been carefully investigated by Professor Barlow, and fully treated by him in his "Essay on Magnetic Attractions." It has therefore been thought desirable to omit the remarks which have appeared in the former editions of this work, and to substitute for them the following practical directions on the subject, which were drawn up with great care and attention from Mr. Barlow's work and other authentic sources, and published in the Nautical Magazine for April 1837.

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## DIRECTIONS FOR ASCERTAINING THE AMOUNT OF THE LOCAL ATTRACTION OF A VESSEL ON THE COMPASS.

The variation of the compass as deduced from observation at sea in different parts of the world, was long considered by seamen as the true variation, or, in other words, that it was the real angle which the magnetic needle makes with the true meridian. And although certain discordances in compass bearings were noticed at different periods by the navigators of former days, yet it nowhere appears that they discovered the cause of those discordances to be the iron distributed through their own vessels; the attractive power of which was continually acting with more or less force on the magnetic needle, sometimes in conjunction with, and sometimes in opposition to, the magnetic influence of the earth.

The earliest notices we have on record of this deviation of the needle from the magnetic meridian are given by Sturmy in his "Mariner's Magazine," published in 1700, and by the celebrated circumnavigator, Captain William Dampier, in the account of his voyage to New Guinea. In the quaint language of his time, Dampier thus alludes to it: "Another thing that stumbled me here was the variation which, at this time, by the last amplitude, I found to be 7° 38′ W., whereas the variation at the Cape of Good Hope it was then computed, and truly, about 11°, and yet a while after this, when I had got ten leagues to the eastward of the Cape, I found the variation but 10° 45′ W.; whereas it should have been more than that at the Cape. These things I confess did puzzle me." This irregularity was no doubt the effect of the iron in the vessel, and although Dampier had a shrewd inquiring mind, it was not to be expected that he should at once hit upon the discovery of its causes. Those causes lay concealed amidst the depths of science, and their discovery was reserved for the persevering efforts of men of the present more enlightened age. Aware, however, of the value of such observations, Dampier very properly recorded them with the view of assisting Halley in the construction of his variation chart,* and recommended all navigators to do the same.

* Halley published this chart, which was the first of its kind, in the year 1700. He had collected a vast number of observations of the variation, which having noted in their proper places on a Mercator's chart of the world, he was enabled, by drawing lines through them, to trace the corresponding degrees of variation, or, in other words, to shew the course of the magnetic curves. Another chart of this kind was published by Mountain and Dobson in 1744, and another in 1756-7, and from the apparent facility of observing the variation, it was even seriously recommended to mariners as a means of ascertaining their longitude. The inefficiency of such means is so obvious, that these charts are now only used for giving a general view of the amount of the variation in different parts of the world. Yeates published another chart in 1817; and more recently Professor Barlow has given us all the modern observations in a chart of two sheets, which he proposed to follow up by a variation globe.

We find nothing that throws any further light on the subject of local attraction until the time of Captain Cook, when the attention of Mr. Wales, who accompanied him as astronomer, was awakened by the differences which he found in his observations. He states distinctly, that "variations observed with the ship's head in different positions, and even in different parts of her, will materially differ from one another; and much more will observations observed on board different ships." Mr. Wales gives instances of these differences amounting to 10°.

The voyage in which he made these observations lasted from 1776 to 1780; and in 1793, we find that the celebrated French naval surveyor, M. Beautemps Beaupré, when employed in the *Recherche* looking for La Peyrouse, abandoned the old system of using compass bearings in consequence of meeting with differences of several degrees in the variations. We may here remark that M. Beaupré was among the first to adopt that excellent system of obtaining the true bearing by an angle referred to the sun's azimuth.

In 1790, however, the first direct mention of local attraction was made by Mr. Downie, when master of H.M.S. Glory, in Walker's Treatise on Magnetism. "I am convinced," says Mr. Downie, "that the quantity and vicinity of iron in most ships has an effect in attracting the needle, for it is found by experience that the needle will not always point in the same direction when placed in different parts of a ship; also, it is very easily found that two ships steering the same course by their respective compasses, will not go exactly parallel to each other,—yet when these compasses are on board the same ship they will agree exactly."

But, notwithstanding the important discovery that such anomalies existed in a machine of so much consequence to the safety of ships as the mariner's compass, they still remained unheeded, until the return of Captain Flinders from the survey of Australia, when, in consequence of his representations to the Lords Commissioners of the Admiralty, he was directed to make a series of experiments on board one of his Majesty's ships at Sheerness.

The results of these experiments are thus stated:—

1st. That a compass gave different bearings of the same object when placed in different parts of the ship.

2d. That when the ship's head was on the magnetic North or South, no effects arose from local attraction, proving that when the ship was in that position the attraction of the various masses of iron on board acted in unison with the magnetism of the earth.

3d. That when the ship's head was East or West, the effects of local attraction were greatest, and that at the intermediate points of the deviation of the needle varied nearly in the proportion of the sine of the angle between the bearing of the ship's head and the magnetic meridian to radius.

4th. That the maximum of variation, in the same compass, would be different in different parts of the world, or, in other words, that the force of the local attraction of the vessel varied with the dip of the magnetic needle, or in proportion to the distance of the magnetic equator.

Flinders died in 1814, and the subject of local attraction lay almost untouched until Mr. Bain, a master in the royal navy, took it in hand, and wrote a pamphlet on it, which appeared in 1817. There was a great deal of merit in this little production; all his were sound opinions; but, although his remarks and observations were accompanied with ample proofs of the importance of attending to them, he failed to give those plain and straightforward directions which the seaman looks for. The subject

was lastly taken up by Professor Barlow, a name well known in the annals of science. The polar expedition of 1818 afforded an admirable opportunity for confirming still further the laws laid down by Flinders, as the ships not only passed through a considerable variety of variation, but necessarily approached the north magnetic pole. Constant observations were accordingly made on board the Alexander and Isabella, at the suggestion of the professor, and it was found, before they had nearly reached Greenland, that the compasses of one ship differed as much as 11° from those of the other, and that the same compass gave results differing 10° in different parts of the same ship. As the two vessels proceeded up Davis Straits, the compasses became sluggish; and in the subsequent voyage of Sir Edward Parry, as he passed through Barrow Strait, they became totally useless—thus confirming the conclusion of Flinders, that, although the magnetic force of the earth would be greatest at the magnetic pole, yet its horizontal or directive power would then entirely cease, having become gradually less in proportion as the angle increased, which the dipping needle makes with the horizontal plane. But while the horizontal needle is thus forsaken, as it were, by the earth's magnetic power, the various magnetic bodies in the ship which surround it are still acting on it with a directive force which *relatively* increases as the directive force of the magnetic pole diminishes.

The discordances in the variations observed at sea, and the difficulty of arriving at the actual inclination which the magnetic meridian makes with the true one, can only be attributed to the want of a due observance of the foregoing facts. But these facts are now so universally admitted, that it is unnecessary to multiply proofs either of their existence or of the evil consequences which may arise from their neglect. We will therefore at once proceed to the best practical methods of determining the local attraction of any vessel, and of applying the proper correction for its effects to the compass courses.

There are two modes of effecting this problem—the first is, observing by a compass, on board, the bearing of a distant object on shore, while the ship makes a complete circuit, or passes through all the points of the compass. The second is, by means of two compasses, one of which is placed on shore at any convenient distance, and the other remains on board, while the ship's head is made to perform a similar revolution.

The former method is the most independent, as it requires only *one* observer; but then it is necessary that the object on shore should be at a distance of several miles, in order that the parallax of the vessel in the circuit she necessarily makes in order to place her head on every point of the compass, be so small as to subtend an insensible angle at the object. The distance requisite to fulfil the above condition will vary from four to ten miles, according to the scope of the cable, or the looseness of the moorings. Assuming this angle to be insensible, or so small as to be within the uncertainty of observation, the bearings then made of the object may be considered as taken from a single spot, and therefore, if it were not for the effect of local attraction, they would of course be all alike.

The correctness of this method evidently depends on the truth of the above assumption, but as a suitable object does not occur at every anchorage, we shall proceed to the second method, which is equally correct, but which requires the co-operation of another observer.

This method consists in taking the bearing of the compass on board from another on shore, at the same instant that the bearing of that on shore is observed from the compass on board. It is evident, that if the two compasses employed have previously agreed in every respect, that each pair of observations would be the reverse of each other, so that if

the compass on board bore S.W. from that on shore, that of the shore would bear N.E. from the compass on board; but in consequence of the effects of local attraction the compass on board will, on almost every bearing, differ considerably.

We will now suppose that a ship lying at Spithead, having all her guns, and cargo, and spare anchors on board, is desirous of obtaining her local attraction by a single observer.

As it is necessary that the ship's head should be placed on each point of the compass, the opportunity of slack water should be taken, and a warp should be properly laid out to a buoy, or to another vessel, in order to secure her performing the revolution gradually. Select any well-defined object on shore, such as a remarkable tree or house on one of the most distant ridges. The azimuth compass should be employed, as it is fitted with sight vanes, and the circumference of the card is divided into degrees; but all the observations must be made from the binnacle, precisely over the usual position of the steering compass.* Then, as the ship slowly presents her head to each point of the compass, the bearing of the object is to be carefully observed, and, if practicable, a moment should be allowed to elapse after the ship's head arrives on each of the different points, so that no error may arise from the swing of the compass.

The bearings as they are obtained must be immediately noted in a table, arranged in the following form, the column No. 1 having been previously written.

When the North end of the needle is drawn to the eastward, the local attraction is marked —, and when to the eastward +.

| No. 1. Direction of Ship's Head. | No. 2. Observed Bearing of Object. | No. 3. Correct Bearing of Object. | No. 4. Local Attraction. | No. 1. Direction of Ship's Head. | No. 2. Observed Bearing of Object. | No. 3. Correct Bearing of Object. | No. 4. Local Attraction. |
|---|---|---|---|---|---|---|---|
| | ° | ° | ° | | ° | ° | ° |
| North | N. 18 E. | N. 17 E. | +1 | South | N. 14 E. | N. 17 E. | —3 |
| N. by E. | N. 17 E. | ............ | 0 | S. by W. | N. 16 E. | ............ | —1 |
| N N.E. | N. 16 E. | ............ | —1 | S.S.W. | N. 17 E. | ............ | —0 |
| N.E. by N. | N. 15½ E. | ............ | —1½ | S.W. by S. | N. 18 E. | ............ | +1 |
| N.E. | N. 14 E. | ............ | —3 | S.W. | N. 19 E. | ............ | +2 |
| N.E. by E. | N. 14 E. | ............ | —3 | S.W. by W. | N. 20½ E. | ............ | +3½ |
| E.N.E. | N. 13½ E. | ............ | —3½ | W.S.W. | N. 22 E. | ............ | +5 |
| E. by N. | N. 13 E. | ............ | —4 | W. by S. | N. 24 E. | ............ | +7 |
| East. | N. 12 E. | ............ | —5 | West | N. 24 E. | ............ | +7 |
| E. by S. | N. 10 E. | ............ | —7 | W. by N. | N. 25 E. | ............ | +8 |
| E.S.E. | N. 9½ E. | ............ | —7½ | W.N.W. | N. 25 E. | ............ | +8 |
| S.E. by E. | N. 10 E. | ............ | —7 | N.W. by W. | N. 24 E. | ............ | +7 |
| S.E. | N. 10 E. | ............ | —7 | N.W. | N. 23 E. | ............ | +6 |
| S.E. by S. | N. 11 E. | ............ | —6 | N.W. by N. | N. 22½ E. | ............ | +5½ |
| S.S.E. | N. 13 E. | ............ | —4 | N.N.W. | N. 20½ E. | ............ | +3½ |
| S. by E. | N. 14 E. | ............ | —3 | N. by W. | N. 18½ E. | ............ | +1½ |
| | 210½ | | | | 333 | | |
| | | | | | 210½ | | |
| | | | | | 543½ | | |

* Should it be inconvenient to place the azimuth compass immediately over the binnacle, select any other position for it *amidships* on the vessel's deck, and in this case let the direction of the ship's head be noted by both the compasses when the bearing of the object is taken, in order to obtain the bearing of it from the steering compass, from which it may not be visible. The number of degrees between the ship's head and the object by the azimuth compass, applied to the direction of the ship's head by the steering compass, will give the bearing of the object from it, as well as if it had been actually observed.

If time should permit, it would be advisable to repeat this series of observations, in order to guard against any mistakes, and, if practicable, to swing the ship's head round in the opposite direction to that of the first revolution.

The observer having now filled up column No. 2 with the observed bearings, and being satisfied with their accuracy, he is to add them all together, making in this example 543½, which being divided by the number of observations (32), the result (17) will be the mean or true magnetic bearing of the object from the ship, and therefore 17° is to be entered on every line of column No. 3.

The differences between the figures in columns Nos. 2 and 3 are then to be regularly inserted in column No. 4, and as they represent the effect of the local attraction of the ship upon the needle in the binnacle, for every successive point of the compass, they cannot be more compendiously placed for the ready reference of the navigator in correcting his day's work. To prevent the chance of his applying them the wrong way, it will be prudent to mark them all with the signs + or — according as they are to be applied to the right or left of the course to be corrected.

Or perhaps a table of the points ready corrected, such as the following, might to some seamen be more satisfactory; but whichever table is adopted, a copy of that table should be hung in the binnacle, and every person on board who keeps a reckoning should have a copy of it attached to his traverse table.

| Courses by Compass. | Courses corrected for Local Attraction. | Courses by Compass. | Courses corrected for Local Attraction. | Courses by Compass. | Courses corrected for Local Attraction. | Courses by Compass. | Courses Corrected for Local Attraction. |
|---|---|---|---|---|---|---|---|
| North | N. 1° W. | East | S. 85° E. | South | S. 3° W. | West | S. 83° W. |
| N. by E. | N. 11¼ E. | E. by S. | S. 71¾ E. | S. by W. | S. 12 W. | W. by N. | N. 86¾ W. |
| N.N.E. | N. 23½ E. | E.S.E. | S. 60 E. | S.S.W. | S. 22½ W. | W.N.W. | N. 75½ W. |
| N.E. by N. | N. 35¼ E. | S.E. by E. | S. 49¼ E. | S.W. by S. | S. 32¾ W. | NW. by W. | N. 63¼ W. |
| N.E. | N. 48 E. | S.E. | S. 38 F. | S.W. | S. 43 W. | N.W. | N. 51 W. |
| N.E. by E. | N. 59¼ E. | S.E. by S. | S. 27¾ E. | S.W by W. | S. 52¾ W. | N.W. by N. | N. 39¼ W. |
| E.N.E. | N. 71 E. | S.S.E. | S. 18½ E. | W.S.W. | S. 62½ W. | N.N.W. | N. 26 W. |
| E. by N. | N. 82¾ E. | S. by E. | S. 8¼ E. | W. by S. | S. 71¾ W. | N. by W. | N. 12¾ W. |

Thus if a ship was apparently steering S.E. by the compass, she would be actually steering 7° to the southward of that point or S.E.⅔S. and in working the day's work, the —7° must be applied to that course; but if on the other tack she should lie up North, only 1° would be the correction to be applied, and that with the contrary sign.

The above mode of discovering the local attraction is so simple and so perfectly in every seaman's power, that surely none but the most perversely indolent will continue to blunder through their voyages as heretofore. Every ship in the Queen's service should be ordered to make a return to the commander in chief of the local attraction, in a form similar to the table we have given, and every six months the experiment should be repeated and reported.

Having shewn the means by which the seaman may obtain the desired object with a single compass, we will now describe the second method, which, however, requires the assistance of two compasses and two observers. The two compasses selected for the operation, should precisely agree with each other. One of them mounted on a tripod stand is said to be taken on shore at a short and convenient distance from the ship, and so placed as to be easily seen from the other compass which remains on board in its proper position in the binnacle, from whence the principal observer will watch the

progress of the ship's head and by some preconcerted signals he will communicate the instant of his making each observation to his assistant on shore.

The best means of doing this will be by a light staff in his hand with a little flag or a white handkerchief fixed to it. The process would be as follows:—The proper warps being prepared as in the former experiment, to check the rapidity of the ship's swinging, and to steady her head on each point of the compass for an instant, the observer on board displays his little flag, in order to warn the observer on shore to look out. A few moments may elapse with the flag up, while the ship is becoming steady and the compass settling. Then commencing at any point on which the ship's head happens to be, the bearing of the shore compass is taken, and at the same instant the flag is put down. The assistant on shore at the instant of the disappearance of the flag, observes the bearing of the compass on board, and each observer carefully registers his observation. The ship's head is then placed on the next point of the compass, when the same process is followed, and so on throughout all the other points. The observations are then tabulated, according to the following form, and the direction of the ship's head being placed against each pair of observations, their difference shews the deviation of the needle on board from the magnetic meridian. When the proper signs are applied as before explained, this table shews the effect of the local attraction for each point of the compass, and is ready for use.

| Direction of Ship's Head. | Bearing of Shore Compass from on Board. | Bearing of Compass on Board from Shore Compass. | Difference or Local Attraction. | Direction of Ship's Head. | Bearing of Shore Compass from on Board. | Bearing of Compass on Board from Shore Compass. | Difference or Local Attraction. |
|---|---|---|---|---|---|---|---|
| North | S. 36° W. | N. 36° E. | 0° | South | S. 32° W. | N. 31° E. | +1° |
| N. by E. | S. 30½ W. | N. 34 E. | —3½ | S. by W. | S. 33 W. | N. 31 E. | +2 |
| N.N.E. | S. 30 W. | N. 34½ E. | —4½ | S.S.W. | S. 34 W. | N. 31 E. | +3 |
| N.E. by N. | S. 32 W. | N. 34½ E. | —2½ | S.W. by S. | S. 34½ W. | N. 31 E. | +3½ |
| N.E. | S. 29 W. | N. 34 E. | —5 | S.W. | S. 35 W. | N. 31 E. | +4 |
| N.E. by E. | S. 29 W. | N. 34½ E. | —5½ | S.W. by W. | S. 34 W. | N. 30½ E. | +4½ |
| E.N.E. | S. 29 W. | N. 34⅓ E. | —5⅓ | W.S.W. | S. 38 W. | N. 33 E. | +5 |
| E. by N. | S. 25 W. | N. 33 E. | —8 | W. by S. | S. 40 W. | N. 34 E. | +6 |
| East | S. 27 W. | N. 34 E. | —7 | West | S. 40 W. | N. 34½ E. | +5½ |
| E. by S. | S. 27 W. | N. 33 E. | —6 | W. by N. | S. 41 W. | N. 35 E. | +6 |
| E.S.E. | S. 27 W. | N. 33½ E. | —6 | W.N.W. | S. 40 W. | N. 35 E. | +5 |
| S.E. by E. | S. 27 W. | N. 32½ E. | —5½ | N.W. by W. | S. 39 W. | N. 35 E. | +4 |
| S.E. | S. 28 W. | N. 32 E. | —4 | N.W. | S. 40 W. | N. 36 E. | +4 |
| S.E. by S. | S. 28 W. | N. 32 E. | —4 | N.W. by N. | S. 40 W. | N. 38 E. | +2 |
| S.S.E. | S. 27 W. | N. 30 E. | —3 | N.N.W. | S. 39 W. | N. 37½ E. | +1½ |
| S. by E. | S. 30 W. | N. 31 E. | —1 | N. by W. | S. 38 W. | N. 38 E. | +0 |

Then from the foregoing, the following table may also be formed:

| Courses by Compass. | Courses Corrected for Local Attraction. | Courses by Compass. | Courses Corrected for Local Attraction. | Courses by Compass. | Courses Corrected for Local Attraction. | Courses by Compass. | Courses Corrected for Local Attraction. |
|---|---|---|---|---|---|---|---|
| North | North° | East | S. 83° E. | South | S. 1° E. | West | S. 84½° W. |
| N. by E. | N. 14½ E. | E. by S. | S. 72¾ E. | S. by W. | S. 9¼ W. | W. by N. | N. 84¾ W. |
| N.N.E. | N. 26½ E. | E.S.E. | S. 61½ E. | S.S.W. | S. 19½ W. | W.N.W. | N. 72½ W. |
| N.E. by N. | N. 36¼ E. | S.E. by E. | S. 50¾ E. | S.W. by S. | S. 30¼ W. | N.W. by W. | N. 60¾ W. |
| N.E. | N. 49 E. | S.E. | S. 41 E. | S.W. | S. 41 W. | N.W. | N. 49 W. |
| N.E. by E. | N. 61¾ E. | S.E. by S. | S. 29¾ E. | S.W. by W. | S. 51¾ W. | N.W. by N. | N. 35¾ W. |
| E.N.E. | N. 73 E. | S.S.E. | S. 18½ E. | W.S.W. | S. 62½ W. | N.N.W. | N. 24 W. |
| E. by N. | N. 86¼ E. | S. by E. | S. 10¼ E. | W. by S. | S. 72¾ W. | N. by W. | N. 11¼ W. |

exhibiting, as before, the correct magnetic courses which the ship is actually steering when her head is on the points placed against them, and to which corrected courses the variation is to be applied.

This method, by two compasses, may after all be considered as a modification of that by one; for the compass on shore may be supposed as always in the same line between an imaginary distant object beyond it and the compass on board, at the instant of observation.

Cases may be imagined at sea, where it might be of great importance to aship, the local attraction of which had not been measured, to obtain some near approximation to its amount. This may be often effected by taking several azimuths and amplitudes of the sun with the vessel's head on various points of the compass, and thus inferring the variation due to each of these points. It is manifest that this is only a variety of our first method, described at page xxiii., the sun being employed instead of the distant terrestrial object. Again, a ship will have a thousand opportunities when in sight of the land, of setting by the compass, some very distinct well-defined cape or peak, and of throwing her head into such a variety of positions, as to furnish very considerable data for estimating the local attraction. The maximum being generally within a point or two of East and West, it will be desirable to obtain several bearings with the vessel's head in those directions.

We have said in a former part of this paper that the directive effort on the needle, of the local attraction of the vessel, increases as she recedes from the magnetic equator towards the poles, and therefore the amount of local attraction is continually varying. No favourable opportunity should therefore be lost of ascertaining its amount in different parts of the world. Each set of observations will suffice for a very large range of latitude, but all these observations, provided they were made with the same compass in the same place, should be preserved as affording useful materials for further investigation.

As connected with this not less important than interesting subject, we deem it our duty to allude here briefly to the azimuth compass, and to urge the universal adoption of a practice, which for some years has been gradually making its way in well regulated ships,—we mean the assigning to that instrument one invariable position amidships. Being fitted on a tripod stand, the legs are always placed in the same position by means of marks in the deck, the compass consequently always takes the same place. But as this compass will have its own deviation from the magnetic meridian, arising from local attraction, the seamen should take care to know its amount on each point as compared with the steering compass, in order to apply the variation to that compass which may result from observations with the azimuth compass; and we cannot too strongly insist on the necessity of making all such observations originally assigned to it, *from that spot alone.* A disregard to this important regulation is too common at sea. If the view of the sun should be impeded by a sail, or by the rigging or masts, a position somewhere else is chosen to obviate the inconvenience, instead of the sail being taken in, or the position of the ship's head somewhat altered. Hence an incorrect result is sure of being obtained, for as the local attraction changes in every part of the vessel, so the angle of variation of any one compass, at any one part of the vessel, must be compounded of the two angles which represent the real variation, and the effect of local attraction. We may also here remind the seaman that if he wants to determine the actual variation, undisturbed by the magnetic action of the vessel, he must lay her head on the magnetic meridian or line of no attraction. The important discovery of Professor Barlow, that the influence of iron bodies on the magnetic needle lies entirely in their surfaces, was followed by his ingenious plan of neutralizing

their effects on the compass, by means of a thin iron disc, known by the name of Barlow's Correcting Plate.

We will now describe the mode recommended by the professor, of applying this important acquisition to ships navigating high northern or southern latitudes, where the effect of the deviating power on the needle is so much increased by the great distance from the magnetic equator. From a small code of instructions which accompany the plate we extract the following examples of finding the local attraction. They are similar to those which we have already explained; but as they are referred to in the directions for fixing the plate, we take them accordingly.

" *Observations on the bearing of a distant object in H.M.S. Isabella, with a view of ascertaining the amount of her Local Attraction.*

| Direction of Ship's Head. | Bearing of Object. | Local Attraction. | Direction of Ship's Head. | Bearing of Object. | Local Attraction. |
|---|---|---|---|---|---|
| | ° ′ | ° ′ | | ° ′ | ° ′ |
| North | N. 51 26 W. | —1 36 | South | N. 47 56 W. | +1 54 |
| N. by E. | 50 26 | —0 36 | S. by W. | 48 26 | ×1 24 |
| N. N. E. | 49 41 | +0 9 | S.S.W. | 50 0 | —0 13 |
| N. E. by N. | 48 41 | +1 9 | S.W. by S. | 50 26 | —0 36 |
| N.E. | 47 51 | +1 59 | S.W. | 51 11 | —1 21 |
| N.E. by E. | 46 56 | +2 54 | S.W. by W. | 52 56 | —3 6 |
| E.N.E. | 46 26 | +3 24 | W.S.W. | 53 56 | —3 6 |
| E. by N. | 45 56 | +3 54 | W. by S. | 54 11 | —4 21 |
| East. | 45 26 | +4 24 | West. | 55 11 | —5 21 |
| E. by S. | 44 26 | +5 24 | W. by N. | 55 41 | —5 51 |
| E. S. E. | 44 26 | +5 24 | W.N.W. | 55 46 | —5 56 |
| S. E. by E. | 44 26 | +5 24 | N.W. by W. | 55 46 | —5 56 |
| S.E. | 45 1 | +4 49 | N.W. | 55 11 | —5 21 |
| S.E. by S. | 45 36 | +4 14 | N.W. by N. | 54 26 | —4 36 |
| S.S.E. | 46 26 | +3 24 | N.N.W. | 53 26 | —3 36 |
| S. by E. | 41 56 | +2 54 | N. by W. | 52 26 | —2 36 |

" The following is an example of observations made according to the second method, on board H.M.S. Hecla, Captain Parry, May 8th, 1824:

" *Local Attraction of H.M.S. Hecla.*

| Direction of Ship's Head. | Bearing of Ship, Station from Ship. | Bearing from Ship, Station of Ship. | Local Attraction. | Direction of Ship's Head. | Bearing of Ship, Station from Ship. | Bearing from Ship, Station of Ship. | Local Attraction. |
|---|---|---|---|---|---|---|---|
| | S. E. | N. W. | | | S. E. | N. W. | |
| North | 41° 0′ | 40° 50′ | +0° 10′ | South | 37° 0′ | 36° 58′ | +0° 2′ |
| N. by E. | 42 20 | 43 54 | —1 34 | S. by W. | | | |
| N.N.E. | 42 0 | 45 51 | —3 51 | S.S.W. | 38 30 | 34 53 | +3 32 |
| N.E. by N. | | | | S. W. by S. | | | |
| N.E. | 46 0 | 50 38 | —4 38 | S.W. | 42 20 | 36 30 | +5 50 |
| N.E. by E. | 44 10 | 50 36 | —6 26 | S.W. by W. | 44 0 | 38 30 | +5 30 |
| E.N.E. | 43 10 | 49 33 | —6 23 | W.S.W. | 46 10 | 39 46 | +6 24 |
| E. by N. | 40 50 | 47 29 | —6 39 | W. by S. | 47 20 | 40 48 | +6 32 |
| East | 30 56 | 43 28 | —6 38 | West | 47 0 | 41 29 | +6 11 |
| E. by S. | 34 0 | 40 59 | —6 59 | W. by N. | 49 0 | 41 10 | +7 50 |
| E.S.E. | 30 20 | 37 23 | —7 3 | W.N.W. | 49 50 | 42 49 | +6 51 |
| S.E. by E. | 28 0 | 33 39 | —5 39 | N.W. by W. | 49 40 | 42 58 | +5 42 |
| S.E. | 25 40 | 30 24 | —4 44 | N.W. | 49 0 | 43 52 | +5 8 |
| S.E. by S. | 27 50 | 31 1 | —3 11 | N.W. by N. | 47 0 | 43 24 | +3 38 |
| SS.E. | 29 40 | 32 0 | —2 20 | N.N.W. | 45 30 | 42 44 | +2 46 |
| S. by E. | 30 0 | 31 30 | —1 30 | N. by W. | 43 10 | 41 36 | +1 34 |

"*Method of fixing the Plate.*

"The local attraction being determined by either of the above methods, take the mean of the two deviations when the line of no attraction is N.E. and N.W. the mean of the two at East and West, and the mean of the two at S.E. and S.W.* In the present case these would be, mean at N.E. and N.W. 4° 53′; mean at E. and W. 6° 24′ mean at S.E. and S.W. 5° 17′.

"Look for three corresponding or nearest local attractions in any one line in the following table, filled up with written figures sent with the plate, and opposite to them, in the first two columns, stand the proper depth and distance that the plate is to have with respect to the compass; that is, the first column shows the depth in inches the centre of the plate is to be fixed below the pivot of the needle; and the second, the distance it is to be placed from a plumb-line falling from the centre of the needle,—observing always to place it in the line of no attraction, which in the last example, and in the generality of cases, is fore and aft; but in the first example of the Isabella, it is in a line passing from the compass, at an angle of two points, with the keel of the vessel over the larboard bow.

"In this line of no attraction, and at the depth and distance as above described, the plate may be fixed either fore or aft of the compass; but the latter is best, particularly in northern voyages, because, when thus situated, it gives considerable freedom to the needle, and causes it to traverse where it would otherwise be useless for want of directive power; and the action of the iron being neutralized by the plate, the bearing of the needle is always correct while the latter is in its place. When it is placed before the compass, the plate is only used occasionally, its attraction is the same as the ship's, but it is in the same direction; by applying it, therefore, at any time, the amount of the attraction may be ascertained; but it is not neutralized as in the former case. It will of course be understood that the brass conical part, sent with the plate, is to be screwed upon the pedestal or compass-stand, to serve as a socket for the brass pin which carries the plate; and that when the place for the plate is determined, a hole is to be drilled through the brass pin, to correspond with the hole in the socket, in which a smaller pin is inserted to keep the plate to its place."

* In the first example, as the line of no attraction is oblique to the keel or fore and aft line, the mean of the points with the line of no attraction at N.E. N.W., E. and W., and at S.E. and S.W. will be, when the ship's head is E.N.E. and N.N.W. 3° 30′; E.S.E. and W.N.W. 5° 40′; S.S.E. and W.S.W. 3° 15′.

*Attractions, determined experimentally, of Plate No.*

| Depth of Centre of Plate below Compass. | Dist. of Plate from Plumb Line through centre of Compass. | Mean Attraction of plate at N.E. and N.W. | Mean Attraction of Plate at E. and W. | Mean Attraction of Plate at S.E. and S.W. | Depth of Centre of Plate below Compass. | Dist. of Plate from Plumb Line through centre of Compass. | Mean Attraction of Plate at N.E. and N.W. | Mean Attraction of Plate at East and West. | Mean Attraction of Plate at S.E. and S.W. |
|---|---|---|---|---|---|---|---|---|---|
| 11 | 10 | | | | 15 | 13 | | | |
| 11 | 11 | | | | 15 | 14 | | | |
| 11 | 12 | | | | 15 | 15 | | | |
| 11 | 13 | | | | 15 | 16 | | | |
| 11 | 14 | | | | 15 | 17 | | | |
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| 14 | 15 | | | | 18 | 16 | | | |
| 14 | 16 | | | | 18 | 17 | | | |

Having now laid down these instructions before our readers, it is no less our duty to lay also before them the objections which have been advanced against the use of the plate.

It is held that the method proposed for the correction of the local attraction is not founded on sound principles, though possibly, in a practical point of view, where the local attraction is of so small amount, no great errors might arise from the application of the plate, so long as the vessel is on an even keel, that position in which it was originally fitted. But even in this case, if a small mass of iron, placed so near to the compass as is here required, neutralize the effect of the distant large masses in some positions of the ship, in others of necessity it must fail to do so. In some cases it must leave part of the local attraction uncorrected; in others it must over-correct that force, producing a deviation of the needle in a direction contrary to that which the local attraction would produce. This effect would arise from the length of the needle being extremely small, as compared with the distance of the large masses; but great, relatively to the distance of the correcting plate. Professor Christie has pointed out in the Philosophical Transactions, that in a deviation of 13° or 14° by iron, at the distance of twenty-four inches, there was a difference of two, in the deviation of a needle six inches long, and that of one, in a needle one and a half inches long; and the deviation of this again differed from the deviation of a needle of three inches long. If the vessel heels much, the resultant of the ship's attraction and that of the plate on the needle will be considerably inclined; and cases may therefore occur, where the correcting plate might increase the effect which it was intended to counteract.

Chronometers.

CHRONOMETERS would be highly useful for the improvement of marine geography, were navigators to adopt an *uniform method*, by marking in their journals the longitude obtained by these excellent machines. In taking a departure for chronometers at sailing from any port or headland, the longitude *allowed* to that place should be marked distinctly in every ship's journal; and the longitude measured from it by chronometers to every headland, island, or danger, during the passage, ought to be carefully stated; by which means the *relative* meridians of those places will be obtained, and be ready to be compared with the admeasurement of the same by other chronometers.*

But unfortunately, the generality of navigators seldom mention in their journals the longitude which they have allowed to the place of departure; and instead of carrying on the longitude made daily from the meridian of that place, they mark longitude from the meridian of Greenwich. The journals, therefore, are of little or no use for any future purpose, on account of the indefinite manner in which the longitude is marked.

Lunar observations.

When the longitude obtained by lunar observations is carried on daily by chronometers, it ought also to be marked distinctly, in order to prevent any mistake.

When lunar observations are taken, the objects on both sides of the moon ought always to be observed if possible, and the mean taken; which will contribute to correct or modify the errors of the instrument, particularly when the distances are nearly equal and fall on the same part of the arch of the sextant: and the difference of longitude run by log, between day and night observations, ought never to be applied in carrying on the one to the other, if there is a chronometer on board. If, for instance, some observations of the sun and moon are taken in the afternoon for longitude, altitudes of the sun should be taken nearly at the same time to obtain the error of the chronometer, for the apparent time at ship; having also marked down the time by chronometer when the distances of the sun and moon are observed, the error of chronometer must be applied to it, to reduce it to the apparent time of observation. When the observations are taken afterwards by the moon and stars in the night, the time by chronometer ought likewise to be marked down, and its error applied, together with the loss or gain of the chronometer (proportionate to its daily rate) for the time elapsed between these observations and those taken in the afternoon by the sun and moon. The apparent time at ship when the observations of the moon and stars were taken, will then be measured by chronometer to the meridian of the place where the observations of sun and moon were taken in the afternoon, and the mean of both should be taken for the longitude of that place, after comparing the apparent time of observations with the Greenwich apparent time. By using the chronometer in this manner, the errors liable to arise from currents, and from the admeasurement of a ship's run by log, between day and night observations, will be avoided.†

* To shew the utility of this, the following example may be given. In the journals of two ships, which saw the Brill Shoal and Middle Island in the Straits of Salayer, at different times, I find they had lunar observations in both ships, which the journals assert may be depended upon in fixing the longitude of those places. It nevertheless happens, that the observations differ 20 miles; for those taken in one ship make the Brill Shoal and Middle Island 20 miles more easterly than those of the other ship; but having chronometers on board of both ships, they *agree exactly* in measuring the difference of longitude between the Brill Shoal and Middle Island, although there is a *difference* of 20 miles in stating the longitudes of these places by the lunar observations.

† It is very perplexing to young navigators, that nautical time, or that used at sea, is 24 hours later than astronomical time; because the nautical almanac, and all the tables in general use, are computed for astronomical time. As the security of navigation depends upon astronomy, it certainly would be of utility to resign this *irregular prejudice*, and make nautical time conform to astronomical time.

## PRECAUTIONARY REMARKS.

Conformably to the design of this work, which is the safety of lives and property, a few precautionary remarks to mariners may be introduced which are the result of the writer's personal observation.

Coral Shoals.

CORAL SHOALS, particularly when they are white or variegated, will generally be visible from the mast-head when the sun is near the zenith, and shining bright. If the situation of the observer is between the sun and coral shoals, the latter may frequently be discerned, although the sun's altitude is not very great; but the glare of the sun will hide them from the observer, when they are situated between him and that luminary.*

Detached clouds, passing with a slow motion under the sun's disc, have their shadows often cast upon the surface of the sea, resembling greatly the appearance of coral shoals.

But as a general rule, it may be observed, that coral shoals are best discerned when the sky is clear, with the sun shining at a great altitude; and particularly if the situation of the observer be between them and the sun, with his eye considerably elevated above the surface of the sea.

Coral reefs abound chiefly within the tropics, particularly in the Indian and Pacific Oceans, and round New Holland; many of the islands are either surrounded by these reefs or stand upon a coral base. The formation of coral reefs by zoophytes is very remarkable, as these are neither perfect animals nor vegetables, but partake of both. Most of them take root and grow up into stems, multiplying life in their branches, and in the transformation of their animated blossoms or polypes, which are endowed with spontaneous motion. Plants, therefore, resemble zoophyta, but are destitute of animation and the power of locomotion; and zoophyta are, as it were, plants, but furnished with sensation and the organs of spontaneous motion. Of these some are soft and naked, and others are covered with a hard shell; and it is astonishing with what rapidity they form coral reefs, by taking root often at the bottom of the sea in deep water, whence the stems branch upward, and gradually but speedily, become transformed into solid rock. As these concretions of coral grow up near the surface of the sea, they become dangerous to ships; and after they appear above it, they are gradually transmuted into islands of various dimensions, according to the extent of their original basis.

Unhealthy places.

Ships which stop on the East coast of Madagascar, at Cape Negrais, Tavay, Nicobars, Poolo Bay, Batavia, Borneo, or at any place within the tropics, where the country is low, woody, uncultivated, and considered unhealthy, ought not to allow any of their people to remain on shore during the night, when wooding and watering at such

* There is a little instrument, recently brought into use for the express purpose of discovering shoals under these circumstances. It consists simply of a piece of *tourmaline*, set in a small tube, for the convenience of applying it to the eye,—the tourmaline having the property of neutralizing the glaring effects of the sun's rays.

places: nor should they be sent on shore in the mornings, until the noxious vapours are dispersed, by the influence of the sun penetrating into the forests.

Swimming.

Persons who have not learned to swim, when they fall into the sea by accident, often drown themselves by lifting their hands *above* the surface, with a rapid and irregular motion. With proper resolution this may be avoided, for a *gentle* and *slow* motion of the hands *under* the surface of the water, either *obliquely* or *perpendicularly*, like the feet of a dog when swimming, will be sufficient to keep the face of any person above the service, if there is no broken water. This will be more obvious, when it is generally known that the specifiic gravity of the human body is *commonly* lighter than sea water, as many persons float on the surface of the sea without any motion.

The natural position for persons to float in, is on their backs, with their arms, which act as levers, extended close under the surface, to preserve them in the natural position. If a person floating on his back place his arms close to his side or across his breast, he will soon be changed from the horizontal position, for his feet will descend perpendicularly, and then his mouth and nose will gradually be immerged under the surface. If in floating, his arms are extended perpendicularly from his body, he will generally remain in the natural position a considerable time before his feet begin to descend from the horizontal to the vertical position. If his arms are extended beyond his head, with the palms of his hands spread just under the surface of the water, he will float steadily in the horizontal position, with his face above the water, and his toes touching the surface. In this manner the author has frequently floated, in warm climates, half an hour at a time without the least motion, and generally was inclined to sleep: by placing the arms a little forward or backward the natural floating position is always adjusted to the greatest degree of regularity. It ought, however, to be observed, that the specific gravity of some persons is rather heavier than sea water, and such persons cannot float with their faces above the surface for any considerable time without employing a little motion with their feet.

On stowage to prevent ships from labouring in stormy weather.

When ships are chiefly laden with *dead weight*, such as iron, lead, zinc, &c., they labour and roll greatly; to modify which, part of the dead weight is generally placed high in the hold, or between the decks. This, however, has little effect in retarding the quick rolling motion, which frequently endangers the masts when there is much swell; for the dead weight being placed over the whole breadth of ships acts as a pendulum on the sides, to augment the rolling motion. Returning from China, in the Anna, by the eastern passage, laden deeply with sugar and tuthenag, we had a gale of wind near the Pellew Islands in which the ship rolled very quick, broke some of the rigging and the foretopmast. In order to prevent this quick and dangerous rolling, tuthenag was taken from the hold, and placed in great quantities upon the decks, until the ship had scarcely stability left to carry proper sail; notwithstanding, there was very little diminution of her rolling.

Were it possible to compress all the dead weight contained in a ship into a ball, and then to place it at the centre of motion, she would in such case roll very little, because there would be no heavy weight near her extreme breadth. But as this cannot be done, an approximation seems desirable, which may be effected by stowing all the light goods along the sides and at the extremities, and the heavy articles in a longitudinal section over, and on each side of the keel, from the fore to the after hatchway, as circumstances require; and the dead weight may be carried up to the deck in this manner,

or to any height consistent with the stability of the ship. This method was adopted in loading the Anna, when a great proportion of her cargo was iron, and she was very easy during the passage from London to Bombay; for the light goods being placed at the *extremities* and in *two sections* along the *sides* of the ship, the cause of her pitching and rolling, was thereby greatly limited.*

## EXPLANATORY REMARKS.

On the common terms applied to the direction of winds, waves, currents, &c.

Explanatory remarks are here necessary, on account of the ambiguous terms applied in common language to the direction of the winds, waves, and currents.

The point from which the wind *proceeds* usually gives it its name: when the wind blows *from* the North, it is called a North wind, and vice versâ. This order, however, seems to have been sometimes reversed by navigators; in the early voyages of the Portuguese to India, the wind that blows *from* N.E. is in some journals called the S.W. monsoon; and that which blows *from* S.W. is called the N.E. monsoon; thereby, taking the name of the place *to* which the wind is proceeding.

The terms used by navigators to signify the direction of the waves, are also very vague and undefined; for although, like the wind, the waves generally receive the name of the direction *from* which they proceed, the waves or swell running from North to South being called a northerly swell, and in like manner for those running in any other direction; this is not always the case; as the waves or swell running from North to South, is called in some journals a southerly swell.

The terms applied to the direction of currents, are generally the reverse of those used to denote the direction of the wind and waves; as the direction *to* which the current is going commonly gives it its name; so that a current running from North to South is almost uniformly called a southerly current, and that running from East to West, a westerly current. Some navigators, however, have been disposed to reverse this order; for one of our circumnavigators, in his voyage to the South Sea, calls a current running from East to West, an easterly current, and vice versâ.

From the indefinite mode, therefore, in use amongst navigators, of marking the direction of the winds, waves, and currents, it seems necessary to state in what manner these *terms of direction* are applied throughout this work.

Terms how used in this work.

*The direction* of the wind is named according to the point *from* which it blows.

*The direction* of the waves, swell, or sea, is named according to the point *from* whence they proceed.

*The direction* of the current is named according to the point *to* which it is running, if not otherwise expressed.

*The course* steered by a ship, signifies her course by *compass*, or magnetic.

*All the bearings* are by *compass*, if not otherwise expressed.

Plans adopted to secure perspicuity and facility of reference.

THE GEOGRAPHICAL POSITIONS of the *principal* places mentioned in this

* Articles liable to ignition, such as oil of vitriol, paint, oil, &c., ought not to be stowed below, but if possible should be placed in a safe place above the decks, in order to prevent the risk of fire. Even coal has been found subject to spontaneous ignition at times, which was experienced at Calcutta in October 1832, on board the ship London, after her arrival from England. She had received from a collier in the River Thames about 300 tons of *pyritous* coal, from which a quantity of smoke was perceived to issue, and a portion of it to have ignited, producing a blue flame when water was poured on the red-hot mass. After removing these ignited coals from the hold, one of the pillars of the lower deck beams was found to be nearly burnt through. The Lord Hungerford, the same season, in the Bay of Bengal, only escaped destruction by deluging her hold with water, as coals of the same kind had ignited also in this ship.

work are stated. The names of the Ports, Headlands, Islands, and Dangers, with which the paragraphs generally commence, have been set forth in *capitals*, in order to render them more conspicuous, and that navigators may not be liable to lose time in searching for any place of which the description is required ; because it frequently happens in critical situations at sea, that a small loss of time may occasion considerable danger. To facilitate the same object, *side notes* have been added, which will be found contiguous to, or fronting, the principal matter contained in each paragraph. And to accomplish this object in the highest degree, a copious *general index* is placed at the end of each volume.

# ENGLAND TOWARDS INDIA.

## TOWARDS MADEIRA; PLACES OF SHELTER NEAR THIS ROUTE.

THE LIZARD POINT, being in lat. 49° 57½′ N., lon. 5° 12′ W., and CAPE FINISTERRE the westernmost promontory of Spain in lat. 42° 54′ N., lon. 9° 17′ W., when clear of the Channel, if the wind continue fair, steer to pass to the westward of Cape Finisterre, at 20, 40, or 50 leagues distance. If the wind prevail at West or W.S.W., pass round the Cape as near as prudence admits, then stand to the southward, and do not lose time by endeavouring to pass it at a great distance; for the wind will probably become more favourable in proceeding southward, and in winter it is a great advantage to get out of the cold weather as soon as possible. **Lizard Point and Cape Finisterre.**

If the projecting part of the French coast, at the entrance of the Channel happen to be approached, it is proper to observe, that Ushant Light is in lat. 48° 28′ 21″ N., and in lon. 5° 3′ 19″ W. The soundings near Ushant are 64 and 65 fathoms:—high water about 4½ hours on full and change of the moon. Variation of the compass about 26½° W. (1828). **Ushant. Tides.**

In the Bay of Biscay, and to the westward of Ushant, the current sets to the westward at times in winter; but in summer, it generally sets N.E. and easterly. It is often found to set eastward from March to November, particularly when westerly winds prevail; and off Cape Finisterre, and near the South part of the Bay, it sets mostly along the Coast to the eastward; and along the East side of the Bay it sets to the northward, parallel to the West Coast of France.* Caution is therefore requisite with a westerly wind, in standing to the southward, to weather Cape Finisterre: for with a ship's position not correctly ascertained, it would be imprudent in cloudy weather to stand to the southward in the night, if not certain of being well to the westward of the Cape.† **Currents near the Channel and Bay of Biscay.**

* Major Rennell, in his investigation of the Currents of the Atlantic Ocean, says, that a branch of the North African or Guinea Current "passes into the Southern part of the Bay of Biscay, and after coasting the Northern shore of Spain, turns to the N. and N.W. along the coast of France; and shooting across the mouth of the English and Irish Channels, bends round to the W., and thence through all the intermediate points to the S.E.; and falling again into the original current, performs a complete rotation between Spain, France, and the Atlantic at large. It is the outer or N.E. side of this vortex, which, by a kind of centrifugal motion, flies off to the N.W. and across the two Channels, and forms the current which so often places ships in danger near Scilly."

† A deplorable example of this, was experienced by his Majesty's ship Apollo, with a fleet of 69 ships under convoy for the West Indies. Having sailed from the Cove of Cork, March 26, 1804, with a fair wind blowing strong, they steered about W.S.W. till the 31st, the wind then came more to the westward. At noon, April 1, the observed lat. 40° 51′ N., lon. 12° 29′ W., *by account*. At 8 P.M. the wind shifted to S.W. and increased

N. W. gales. Gales from W.N.W. sometimes blow into the Bay of Biscay, continuing for several days, and some of the outward-bound East-India ships have been driven far into the Bay during these gales in April and May. If a ship have the misfortune to lose any of her masts during one of these gales, the heavy sea rolling in from N.W. and W.N.W. with an easterly current, would unavoidably force her to leeward; and should the gale continue long and severe, she might be in danger of drifting on a lee-shore. It may therefore be expedient to give a brief description of places in the Bay of Biscay which are sheltered from gales at N.W. or W.N.W.

BELLE-ILE and BASQUE ROAD are the places which afford the best shelter for large ships in westerly gales.

Belle-Ile. BELLE-ILE is about 10 miles long from N.W. to S.E., and 5 miles broad, and lies between the parallels of 47° 24′ and 47° 16′ N., and being high may be seen at a great distance. The N.W. end is surrounded with rocks, and nearly in the line between it and Ile Grouais, mid-way between them, is the Birvideaux Bank. A ship approaching the island with the wind at N.W. or W.N.W., should steer along the South side at 2 miles distance, to Point du Canon, the S.E. extremity; and when abreast of this point, haul up for Point Kerdonis, called in some of our charts Point Loc-maria, which is the easternmost point of the island, distant about 2 miles from the former, anchoring under it in 8, 10, or 15 fathoms, where she will be sheltered from N.W. and westerly winds. If the wind should veer to S.W., she may run to the northward of the point and anchor on the N.E. side of the island.—There is now a revolving light near the S.W. part of the island, in lat. 47° 18′ 40″ N., and lon. 3° 13′ 31″ W.

Ile Hedic. ILE HEDIC, about 7 miles eastward of Belle-Ile, is, with its contiguous dangers, the termination of the rocky range which stretches S.E. from the peninsula of Quiberon. Near the East point of the island there is a small fixed light, which may be seen, in clear weather, about 3 leagues. Off the S.E. end of the island lies a cluster of rocks, called the Cardinals: the largest is distant from Hedic about a mile, and is always above water. If a ship be driven to the eastward of Belle-Ile, she may pass to the southward of the Cardinals a mile distant, then haul up to the northward, and anchor on the East side of *them* and Ile Hedic, in 9 or 10 fathoms, sand and mud.

Ile Ré, &c. Ships bound to Rochelle, or Rochefort, steer for Ile Ré, which has a lighthouse on its N.W. end, in lat. 46° 14′ 44″ N., lon. 1° 33′ 35″ W. In running for this island, care is requisite to avoid two reefs of rocks, on which the sea sometimes breaks, called the Banche Verte, and Roche Bonne: they are nearly 2 leagues in extent S.E. and N.W., distant about 12 leagues West from Ile Ré, in about lat. 46° 12′ N. Near them to the westward there are 60 fathoms water, and 30 fathoms to the eastward of them. From the West point of Ile Ré, a rocky bank, called Les Baleines, extends under water about a league; and from the S.W. part of the island a ridge of rocks, called Chanchardon, extends a full league to seaward; but the Lavardin Shoal is

Lavardin Shoal.

to a gale with a heavy sea; they stood S. S. eastward, and at half-past 3 on the following morning struck on the coast of Portugal, in lat. about 40° 22′ N., 3 leagues northward from Cape Mondego. A few sights obtained, for even an *indifferent* chronometer, on the day preceding this fatal catastrophe, when the sun was visible, or by stars in the night, would have prevented this deplorable loss of lives and immense property! No ship should be without two or three chronometers.

most in the way. It is a small rocky bank, dry at low-water spring-tides, about $1\frac{1}{2}$ miles off the S.E. end of Ile Ré. Ile Oleron lies to the South of Ile Ré, and between them is a channel, about 2 leagues wide, called Pertuis d'Antioche, leading to Basque Road. It is safer to keep nearer Ile Ré than Oleron, on account of some rocky banks, called the Antioches, which lie half a league off the North end of the latter, and which banks extend about the same distance from the shore along its N.E. side till abreast of the South end of Ile d'Aix. When near the S.E. end of Ile Ré steer to the southward, to avoid the Lavardin Shoal already mentioned, lying $1\frac{1}{2}$ or 2 miles off the S.E. end of Ile Ré; afterwards steer for the West part of Ile d'Aix, a flat island, with some houses on it, situated about half-way between Oleron and the main land, keeping nearer Oleron than the main.

BASQUE ROAD extends from the Lavardin Shoal to Ile d'Aix, having from 10 fathoms water close to the shoal, to 12 and 13 fathoms in the middle of the road; and from 5 to 9 fathoms about $1\frac{1}{2}$ miles to the North and N.W. of Ile d'Aix. The soundings in mid-channel, between Oleron to the southward and Ile Ré and Lavardin Shoal to the northward, are generally from 12 to 15 fathoms, shoaling on each side toward the banks. On the northern extremity of Oleron, there is a lighthouse-tower, called Chassiron, shewing a fixed light, in lat. 46° 2′ 51″ N., and lon. 1° 24′ 29″ W. If there be much sea in Basque Road, a ship may run up along the West side of Ile d'Aix, taking care to keep nearer to *it* than to Oleron, to avoid the bank off the latter; and then anchor in 5 or 6 fathoms, off the S.W. end of Isle d'Aix, in the inner road. There is a small fixed light on the fort near the point. Basque Road.

BAYONNE and BILBAO are confined harbours, and have not sufficient water for large ships over the bars at their entrances. Vessels should not attempt to enter them without a pilot. Bayonne and Bilbao.

THE COASTS OF PORTUGAL AND SPAIN having been sometimes visited by India ships, when forced by stormy weather to take shelter in some of the nearest ports in order to repair damage sustained, it may therefore be useful to describe briefly some of the principal headlands and best harbours on the western side of the Peninsula. Coasts of Portugal and Spain.

CAPE ORTEGAL, the northernmost headland of Spain, is in lat. 43° 48′ N., lon. 7° 46′ W.; and about 12 leagues to the south-westward of it, is Cape Prior, in lat. 43° 35′ N., having a very ragged aspect, with some rocks near it, which require a berth in passing. This Cape is above 2 leagues to the N.W. of the entrance into Ferrol, and between 4 and 5 leagues from the Iron tower, or lighthouse of the Groin, or Coruña. Capes Ortegal and Prior.

FERROL BAY, which forms the entrance to its harbour, is 7 miles to the southward of Cape Prior, and is a mile wide, narrowing gradually till it terminates in a channel not more than 2 cables across, which leads to the harbour, and which has sufficient depth of water in mid-channel for large ships at all times of tide. Ferrol.

When a vessel comes near the Bay of Ferrol, the haven begins to open, and you sail in mid-channel between two headlands; but when within, steer to the northward and anchor by the North point, for it is rocky and flat on the West side of the town, and therefore must be avoided.

To enter Ferrol from the southward or westward (after giving a berth to the North point of Ferrol, which is foul and rocky until the haven opens), run right in, and you will be within the South point, clear of its projecting foul ground; steer now for the North point of the haven, and along by it, till the haven opens itself again; from thence keep in mid-channel, where are 12, 14, and 15 fathoms water, though the passage is so narrow that a stone may be thrown across it.

Coruña.

CORUÑA is situated at the bottom of a deep bay, within the mouth of a spacious haven, S.W. of Ferrol, and on the opposite side of the gulf. To enter this port, having made the Sizarga Islands, which being foul must have a good berth, steer for the remarkable lighthouse called the Tower of Hercules, and run in E.S.E., and round the point steering S.E. and S.S.E., giving it a berth of 4 or 5 cable's-lengths. In passing the point, the small Isle of St. Antonio will be seen with a castle on it, round which a ship may sail very close, and anchor off the Fishing Village in 6, 7, or 8 fathoms.

Salvora Isle, and Arosa Bay.

SALVORA ISLE, in lat. 42° 28° N., fronts the bay or gulf of Arosa, which is a deep and excellent haven, extending from the Isle about N.E. a great way inland, having good shelter and moderate depths, with several shoals. The channel into this bay is on the South and East side of Salvora Isle, where a ship is sheltered inside the Isle; but there is no safe passage on the N.W. side of this Isle, it being nearly joined to the main by shoals.

Onza Isles, and Pontevedra Bay.

THE ONZA ISLES, situated off the inlet of Pontevedra, have on the East side safe anchorage from westerly winds. They are two in number, and extend about four miles from North to South. The northern one, which is much the larger, is called Ons, the southern one Onza. The South point of the latter is in lat. 42° 21′ N., off which, at the distance of half a mile, there is a rocky shoal on which the sea breaks in rough weather. Fresh water may be procured at these Islands.

Vigo Bay and Bayona Isles.

VIGO, in lat. 42° 14′ N., lon. 8° 27 W., is situated on the S.E. side of an excellent bay or haven, which is fronted by the Bayona Isles, extending from lat. 42° 11′ N. to 42° 15′ N., and on the East side of these Isles, there is safe anchorage and shelter from the sea and from westerly winds, in 10 and 12 fathoms. The best channel into Vigo Bay, is to the South of these Isles; for the northernmost Isle has a sunken rock about a cable's-length off, which must have a proper berth in entering by the northern channel. When entering the bay, run up in mid-channel, and anchor in 10 or 12 fathoms off Vigo; or farther in, about Point Rondal, where a ship, if destitute of anchors, may be laid in the mud and receive no injury.

Cape Mondego.

CAPE MONDEGO, in lat. 40° 11′ N., lon. 8° 53′ W., is a projecting headland on the coast of Portugal, with a reef stretching out about a cable's-length, having good anchorage and shelter on the South side from North and N.N.W. winds.

Cape Carvoeiro.

CAPE CARVOEIRO, in lat. 39° 22′ N., lon. 9° 24′ W., is a rocky headland, with a lighthouse like a church on its extremity, and being separated by a low sandy isthmus from the inland country, it appears in thick weather like an island, by which some ships, mistaking it for the Burlings, have run on shore on the sandy isthmus.

Burlings and Estellas.

BURLING ISLAND, in lat. 39° 25′ N., is of middling height and size, bearing from

Cape Carvoeiro, N.W. by N., distant 6 miles nearly. N.W. of the Burling, ½ a mile distant, lie six islets, called the Estellas, in an E.N.E. and W.S.W. line, with a rock about ¼ mile to the southward of the southernmost one, visible at low water; there is also a high rock at a small distance N.E. of the Burling.

FARILHAÕS, are a cluster of small islets and rocks, 4 miles north of the Burling. There is a safe channel, about 3 miles wide, between this group and the Estellas; but as the current sets toward the latter, it should not be used without a commanding breeze. Farilhaõs.

The channel between Cape Carvoeiro and Burling Island, being 5½ miles wide, with soundings, may be navigated without fear of danger, and a ship may anchor occasionally under the Burlings.

CAPE ROCA is formed of steep cliffs, with a rocky islet adjoining it, termed by seamen the Rock of Lisbon, from which a reef projects about a musket shot, having 25 fathoms water close to. On the summit of the Cape is a Tower, in lat. 38° 46′ 30″ N., lon. 9° 30′ W., on which a fixed light is exhibited. Cape Razo is a low rocky point, distant 4 miles S. by W. from Cape Roca, having on it Fort Sanxete, or Sinchette, and adjoining it a small shoal. About ½ a league S. E. by S. from Cape Razo is the fort and lighthouse of Guia, and a mile farther to the eastward are the Forts Santa Martha and Cascaes. Round the point on which they stand, the coast bends to the northward, forming Cascaes Bay; on the West side of which is the town of Cascaes, where pilots may be obtained for the Tagus. Fort St. Julian, at the entrance of the River, bears from Fort Santa Martha E. by S., distant 4½ miles. Cape Roca.

THE RIVER TAGUS at its entrance is about 2½ miles wide, between Fort St. Julian and the low sandy point of the south-eastern shore. The Channel is, however, contracted to less than a mile in width, by the two sand-banks, called the North and South Cachops, on the latter of which stands the Bugio fort and lighthouse. River Tagus.

Fort St. Julian stands on a steep point, having a tower 120 feet high in the centre of the fort, which serves for a lighthouse. From St. Julian to the tower of Belem the distance is five miles E. by S.; and the coast between them forms a bay with numerous edifices, some of which, situated about the middle of the bay, serve as marks for the Great Bar, or principal entrance.

The North Cachop extends about 3 miles to the south-westward of Fort St. Julian, and the sea breaks on it with a westerly wind. The channel between this bank and the North shore is called the Corridor or Little Bar, having 5 and 6 fathoms water, but being narrow can only be used with a fair wind.

The South Cachop is a sand-bank, having on it the tower of Bugio, formed of two circular concentric buildings, on the middle of which rises a little tower, 63 feet high, from which is exhibited a revolving light, bearing from St. Julian S. S. E. ¾ E., distant 1¼ miles. The tower is isolated by the sand being covered every tide, and the bank extends from it 2 miles to the S.W. The Great Bar is formed between the outer points of the North and South Cachops, and has on it a depth from 5½ to 10 fathoms. The channel is no where less than ¾ of a mile wide, with from 10 to 18 fathoms good bottom; a bank stretches across between the Cachops, having not less than 8 or 9 fathoms on it, and increasing to 15 and 20 fathoms inside. The water shoals suddenly to both the Cachops, having 6 or 7 fathoms close to. The Bar and Channel.

To cross the Great Bar with a fair wind, the leading marks should be brought on before the meridian of Cascaes is passed, or by bringing Cape Roca lighthouse on with that of Guia, which will be sufficiently to the westward of the Cachops till the To enter the Tagus.

Paps* be discerned; these must be brought in one with Jacob's Ladder,† and so kept until the Tower of St. Julian bear W.N.W. or West, when the North shore of the river may be navigated to the anchorage of Belem.

If, when near the bar, a strong westerly wind prevent pilots from getting on board, or if the marks be not clearly discerned, do not pass the meridian of Cascaes till Belem Tower be brought on with the North end of the outer wall of Bugio, bearing E. ¼ N. Steer on this bearing till the Tower of St. Julian bear N.E.; being then in mid-channel, steer for the Turret of Caxias, which bears E.N.E.; keep this course till abreast of Paco d'Arcos, then coast the northern shore to Belem.

If the Mirante or Turret of Caxias be not seen, then, as soon as the tower of St. Julian bears N.E., you will be 2¼ miles from Bugio, for which steer no longer, but steer midway between St. Julian and Bugio, or so as to make good an E.N.E. course until past the bar.

The North shore of the river is the safer of the two to approach, the anchorage being better, the depths less, and the tides not so strong as near the South shore. During the freshes, the ebb tide runs frequently 6 miles an hour in the channel, requiring a press of sail to stem it, and at such times, when westerly winds blow strong, the sea breaks all across the bar between the Cachops, and cannot be easily distinguished from the breakers on the Cachops. It is high water on the bar at 2½ hours on full and change of the moon.

Tides.

Lisbon Observatory.

The observatory of Lisbon is in lat. 38° 42′ 40″ N., lon. 9° 8′ 30″ W.

Passage to Madeira.

After leaving the English Channel, steer to pass the island of Madeira, at any convenient distance exceeding 7 or 8 leagues. In the winter months, it is preferable to pass to the westward, for strong westerly gales prevail in November, December, and January, producing eddy winds and severe squalls near the land, occasioned by the high land obstructing the regular course of these gales. In November 1797 and December 1799, I was forced to put to sea from Funchal Road. Severe westerly and S.W. gales, with hard squalls and rain, kept us at sea eight days each time, and prevented us from anchoring afterwards; the W.S.W. wind continuing to blow strong. In these gales, the island of Madeira and the Desertas were frequently obscured in fog; and the squalls so sudden and violent near the latter, and about the S.E. end of the former, as nearly to overset one of the ships in company.‡

Westerly gales.

* Two little mounts, about 2 miles N. by E. of Belem Tower, which are visible at a great distance.

† Seven walls or causeways, built to support the soil on the S. E. declivity of a round hill of yellow colour near the sea, 260 feet high. On the top of this hill is a turret, called Caxias, 3 miles E. ¾ N. from St. Julian, formed of two octagonal structures conjoined, each 33 feet high, and terminated in a cupola of similar shape. A good mark for Jacob's Ladder is a long wall near it to the eastward, the buttresses of which, on the side of the Tagus, appear like the arches of a bridge.

‡ November 28, 1797, blowing hard at S. W. off the S. W. end of Madeira, and a high sea rising, we bore away in the Carron, to endeavour to find shelter under the lee of the island. In running between Madeira and the Desertas, blowing very hard at S. W. with dark weather and rain, we were suddenly becalmed; then followed an eddy wind from N. E., the sea so high as frequently to cover the bowsprit and jib-boom. At this time we were much nearer to Madeira than to the Desertas, with a dark cloud extending over us. At the same time, two ships about 2 or 3 miles more eastward, were in clear sunshine, running before a severe squall at S. W.; and one of them had her main topsail blown away. In December 1799, by carrying a press of sail on the Anna, we just cleared the southernmost Deserta, in very thick weather, during one of these westerly storms, which drove us 2° eastward from Funchal. Several outward-bound West India ships were not long ago dashed in pieces on the Desertas in the night, by an error in their reckoning.

PORTO SANTO is a high island with several peaked hills on it, about 12 or 14 leagues north-eastward from the East end of Madeira, and is generally seen by ships bound for the latter: it is surrounded by several small islands, and has a bay and small town on the south side, with anchorage, water, and refreshments. There is a small island off each of the points which form the bay. Although Porto Santo is not so high as Madeira, it may be seen 12 or 14 leagues from a ship's deck; and is easily distinguished from Madeira or the Desertas, by its peaks and uneven appearance, these islands having a more regular outline. The village on the S.W. side is, by Capt. Owen's survey, in lat. 33° 3′ N., lon. 16° 18½′ W. Porto Santo.

The existence of the danger called the *Eight Stones*, to which several positions North of Madeira have been assigned, between the parallels of 34° and 35° and the meridians of 16° and 17°, appears to be extremely doubtful; many of H. M. vessels having by Admiralty order passed over the spot, with the express object of discovering them, but hitherto in vain. Eight Stones.

The Reef said to lie 3 leagues to the N.E. of Porto Santo, on which a Dutch ship was lost, has been found by H. M. S. Falcon to bear about N. 18° W., *true* bearing, from the body of the island, distant from the nearest point about 5 miles. Dutch Shoal or Falcon Rocks.

The Falcon, Lieutenant J. Bowen, examined this reef, or rocky bank, on the 10th of January, 1802. It extends East and West about a mile, terminating in a point of rocks to the westward, on which the least water appeared to be 4½ fathoms. Lieutenant Bowen remarks, that when the bearings were taken upon it in the boat, the compass was agitated by her motion, and therefore they may not be perfectly correct; but he is certain that the boat was on the shoalest part, otherwise the sea must have broke on it had there been less water, by the considerable swell and fresh breeze which prevailed at the time. Coming on to blow, he was prevented from making further observations.

With the wind from the northward or N.E., bound to Funchal, the channel between Madeira and the Desertas is the most convenient, and seems about 4 leagues wide from the East point of Madeira to the Flat or Table Deserta, which bounds it to the eastward.

THE DESERTAS are three high barren islands, the northernmost being much lower than the others and level. The middle Deserta is the largest, between which and the southernmost, called Bogia, there is a narrow channel, never to be attempted unless from necessity, as a ship is liable to be becalmed in it by the northern Deserta, which over-tops Bogia. The fleet under convoy of H. M. S. Lavinia, bound to India, and to touch at Funchal, passed through the channel between the Middle and South Desertas, in May 1809. They mistook the Desertas for Madeira, and after steering for the South extreme of the Large or Middle Deserta, proceeded through the channel between it and the southern Island; this channel is 1 or 1½ miles wide at most, and seems perfectly clear of danger. None of the ships tried for soundings, but the fishermen say, that bottom may be got with 60 to 300 fathoms of line, according to the distance from either shore. Desertas.

The Desertas stretch nearly North and South, and have rather an even appearance, and are about 5 leagues in extent. The northernmost small level island is seen at 5 or 6 leagues distance, just appearing above the water, and close to its North end there is a pyramidal rock, which may be mistaken for a ship under sail.

MADEIRA is very high, and is generally clouded, except in serene weather; the East point in about lat. 32° 44′ N., projects in a kind of peninsula, rather low and rugged, forming to the southward an indentation or bay, in which soundings are said to be found Madeira.

near the shore. There is a perpendicular high cliff of majestic appearance, about $3\frac{1}{2}$ leagues westward from Funchal, called Ponta de Sol, with a small bay to the eastward of it, said to have anchorage in it near the shore. In westerly gales and stormy weather, Ponta de Sol (*Point of the Sun*) is often ornamented with beautiful portions of rainbows, which give it a grand appearance. In summer, when the weather is settled, off Funchal Valley there are regular land and sea breezes; the sea-breeze setting in from south-westward in the forenoon, and the land-breeze coming from the shore generally about 10 o'clock at night, but sometimes not till 2 or 3 o'clock in the morning. These land-breezes do not extend above 3 or 4 miles off shore. It has been said, that southerly winds never blow severely quite to the shore at Funchal; that the south-westers or south-easters are never expected, except in January, February, and the beginning of March, and that large ships always ride them out; whereas, it is certain, these southerly gales blow quite home to Funchal, sometimes in November and December; and when they are apprehended, it is common for ships of every description to put to sea. These S.W. or S.E. gales are in general preceded by a swell tumbling into the road, often accompanied by gloomy weather, drizzling rain, and an unsettled breeze from the land, veering several points backward and forward very suddenly. With such indications, ships generally proceed to sea, for should it blow from the southward, it would be almost impossible to clear the shore on either tack after cutting or slipping, the anchorage being near the land. Some ships have rode out these southerly gales, but others have been driven on shore.*

Ponta de Sol.

Prevailing winds.

Southerly gales.

Indication of them.

Directions for sailing to Funchal Road.

Passing through the channel between Madeira and the Desertas, it is necessary to preserve a considerable distance from the land to prevent being drifted in calm weather near either, there being no anchorage. In November, 1797, the Anna drifted in a calm very near the shore to the northward of the Brazen Head, and brought up with the stream anchor in 60 fathoms water, her stern not far from the rocky cliffs. After being at anchor some time, a light breeze from the land, with the help of the boats towing, enabled her to get out from this perilous situation. When a ship has advanced through the channel, and is approaching Brazen Head, she should not keep near it, in case of being becalmed, as there is no anchorage close to this steep bluff point, which is the eastern extreme of Funchal Road.

Near this bluff head-land, ships are frequently baffled by eddy winds and calms, and are obliged to get their boats out to tow; it is therefore advisable not to borrow too closely to it in passing, nor to haul in for the road till nearly abreast of the town. If a ship enter the road by night, it is proper to show a light at her ensign staff, to prevent being fired at from the forts. Working in with a land breeze, it is best to make short tacks opposite the valley, for here both the land and sea breezes prevail. The Loo Rock, situated near the shore, at the West end of the town, is a high rock with a fort on it; and the Citadel is a brown square fort on a hill, over to the N.W. part of the town. The best berth for large ships is the Citadel a little open to the eastward of the Loo Rock, in 30 or 35 fathoms water; the distance from the Loo Rock will then not much exceed half a mile.

Anchorage.

With the Loo Rock and Citadel in one, bearing about N.N.E. $\frac{1}{4}$ E., Funchal steeple N.E. $\frac{1}{4}$ N., the anchorage appears equally good, in 35 fathoms stiff ground. With the Loo Rock and Citadel in one, the ground is also good in 45 fathoms, about a mile off the former. Farther to the westward the ground is not so good, and to the eastward the

* Not long ago, several ships at anchor in Funchal road were driven on shore, and wrecked by one of these gales. This, I think, happened in April or May. The S. W. gales are more frequent at Funchal than any other strong winds.

bank has a sudden declivity from 50 to 55 fathoms good ground, to 100 fathoms rock, and then no ground. If south-westers are expected, which are frequent in winter, to anchor with the Loo and Citadel in one, or the latter, just open to the westward of the Loo, is the most convenient berth to put to sea from, or to ride out a S.W. gale. But the Citadel well open to the eastward of the Loo is the best anchorage when south-easters are expected. In coming into Funchal Road with a brisk wind, sail should be reduced in time, to prevent having too much way through the water, at the time of anchoring; and a ship should be brought up with her head to seaward, that in case any accident should prevent her bringing up, sail can be made off shore, or otherwise as most expedient. When there is the least appearance of unsettled weather, it is best to ride with a whole cable, with a slip buoy on it, in case of being obliged to cut near the end or splice, and put to sea quickly; as there would not be time to weigh the anchor, by the sudden approach of blowing weather. In light breezes and calms, it is proper to have a kedge anchor out to steady the ship, and prevent fouling the bower. Caution.

The beach is composed of shingle, and has generally a surf on it, which prevents a ship's boat from landing abreast the town; but on the N.W. side of the Loo Rock, about half a mile from the town, is the only place safe to land from a ship's boat; the country boats are employed in watering, &c.

In summer, when the N.E. wind prevails, a S.W. current sets through the channel between Madeira and the Desertas. The current along the South side of Madeira and the Desertas mostly sets to leeward in strong gales; but at the conclusion of a gale, it sometimes changes suddenly, and sets contrary to the wind. The tides rise and fall about 9 feet in general at full and change, when it is high water at 12h. 15m. The rainy season is said to be January, February, and March; October is also frequently a wet month. And when hard westerly gales blow in November, or more particularly in December, they bring with them cloudy weather and rain. Current. Tides. Rainy season.

There have been instances of hurricanes blowing down through the Valley of Funchal; a condensed cloud once poured a torrent of water on the mountain at the head of the valley, which deluged many vineyards in its passage, and washed away some of the houses in the town.* Storms.

Funchal is in lat. 32° 38′ 40″ N. by above 100 meridian altitudes of Stars on both sides the zenith, observed by General Sir Thomas Brisbane and Professor Rumker, in June 1821. Position of Funchal.

Dr. Tiarks, in 1822, was sent with 14 good chronometers, in H.M.S. Owen Glendower, for the express purpose of measuring the difference of longitude between Greenwich and Funchal. He made the longitude of the British Consul's House 16° 53′ 45″ W.

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## FROM MADEIRA TO THE SOUTHWARD:

### SALVAGES, CANARIES, AND CAPE DE VERDES.

On leaving Funchal, steer directly from the shore, to prevent being baffled by calms or eddy winds under Ponta de Sol, or the Brazen Head, for vessels are liable to calms under the high land. From Madeira to the Southward.

* The small-pox is much dreaded at Madeira; were a ship discovered to have this distemper on board, she would be ordered to leave the port.

Departing from Madeira, or after passing it to the westward, the usual track is to the westward of the Canary and Cape de Verde Islands, at any discretional distance, or barely in sight of them, where steadier winds may be expected, than close to, or among these islands. The Britannia, outward-bound in November 1803, had W.S.W. and S.W. winds, and was several days close to the coast of Africa, in lat. 29° N. In January 1795, the Swallow, after passing in sight of the Canary Islands to the westward, had westerly winds, which carried her to the eastward of Cape de Verde Islands; but it is preferable to pass to the westward of all these islands in August, September, October, and November more particularly: but many navigators, in January, February, and March, prefer the passage to the eastward of the Cape de Verde Islands. Captain Heathorn, of the ship Claudine, homeward-bound from India, *twice*, in September, passed to the northward, inside of the Cape de Verde Islands, with steady southerly winds, which changed into the N.E. trade wind, when to the northward of these islands. Hence it appears, that in part of August and September, southerly winds sometimes prevail between the coast of Africa and the Cape de Verde Islands; and in the same locality, northerly winds may usually be expected in December, January, and part of February.

If a ship be bound to Tenerife, or intend to pass between the Canaries, or is laid off to the S. S. E. after passing Madeira, care is requisite to avoid the Salvages, which must not be approached in the night on account of the reefs and straggling rocks extending from the Pitons, the south-westernmost of these islands.

Salvages.

THE SALVAGES are in two distinct groups, distant from each other about 8 miles in a N.E. and S.W. direction, with a safe passage between them.

The north-eastern group is formed of the Great Salvage with its surrounding rocks. It is high and rocky, and may be seen at the distance of 8 or 9 leagues. The hill near the western point of the island is in lat. 30° 7′ 51″ N., and lon. 15° 51′ 20″, according to the survey of H. M. S. Leven in 1819.

The south-western group consists of two islands, called the great and little Piton, surrounded by rocks and reefs. The little Piton is about $1\frac{1}{4}$ miles to the westward of the Great Piton, and has a reef projecting beyond to the westward half a league.

Canary Islands.

THE CANARY ISLANDS are eleven in number (four of them small), extending from lat. 27° 40′ to 29° 20′ N., and from lon. 13° 35′ to 18° 6′ W.* They are mostly high, with steep rocky shores, rendering the landing often impracticable, and they are all destitute of safe harbours for large ships. The channel between these Islands and the African Coast is about 20 leagues wide, and clear of danger.

The channels among the Canary Islands are clear of dangers, except a doubtful sunken rock, in lat. 27° 52′ N., in the channel between Canary and Tenerife, about 7 leagues from the latter, and 5 leagues West from the former; which many navigators think has no existence. Several of the outward-bound ships pass between Palma and Gomera, when laid off to the eastward by westerly winds, or otherwise. Mean variation by Capt. Vidal $20\frac{1}{2}$° W.

Palma.

PALMA, the north-westernmost of these Islands, 8 leagues long and 5 leagues broad, is frequently seen by the outward-bound East-India ships: being high, with a bold coast, some navigators approach it with great confidence; but several ships have

* The survey of these islands was commenced by Lieut. Arlett, R. N., in 1834-35, and carried forward by Capt. A. T. E. Vidal, R. N., in 1837-38. The positions here given are from this Survey.

been nearly lost on it in dark nights, the lights on the impending mountains first showing their situation: and even in the day it is sometimes completely obscured by fog clouds. The North point is in lat. 28° 51′ N., lon. 17° 55′ W.; the West point in lat. 28° 46′ N., lon. 18° 0′ W.; and the South point in lat. 28° 27′ N., lon. 17° 50′ W. This island is said to be more subject to westerly winds and rains than any of the others.

TENERIFE is the largest and, from its magnificent Peak, the most remarkable of the Canary Islands. It is triangular in shape—its length from N.E. to S.W. is 47 miles, and its greatest breadth from N.W. to S.E. 28 miles. Captain Vidal, of H.M.S. Etna, who surveyed the Canaries in 1838, and who ascended the Peak, makes its latitude 28° 17′ N., and longitude 16° 39′ W. Its elevation above the sea is about 12,300 feet. North extreme, lat. 28° 37′ N., lon. 16° 9′ W. South Point, lat. 28° 0′ N., lon. 16° 41′ W. West Point, lat. 28° 21′ N., lon. 16° 56′ W. Tenerife.

Santa Cruz, on the S.E. side and near the N.E. end of Tenerife, is the chief town of the Canary Islands. It is the port generally used by ships which stop at these Islands to procure refreshments. The Road, though indifferent, is one of the best in the Canaries. Ships going in should not bring any part of the town to the northward of West, or they may be becalmed by the high land under the Peak, and drifted on the rocky shore, where no bottom is found close to it with 200 fathoms line. Merchant ships and small vessels anchor to the north-eastward of the pier, off the town, in 18 and 20 fathoms, distant from the shore ½ a mile. Ships of war anchor off the northernmost fort, about ½ a mile distant from it, with their outer anchor in 36 fathoms, and the inner one in 15 or 18 fathoms. The Hindostan, in October 1792, at anchor in 28 fathoms dark mud, had the southernmost steeple West, the northernmost fort North, and the easternmost point E. ½ N. H. M. S. Satellite touched here, in 1827, and got no bottom at 105 fathoms, when she had the marks on formerly recommended for anchoring; she steered into the West side of the bay, within three cables' lengths of the shore, and about an equal distance from the North Fort, then anchored in 38 fathoms soft ground on the edge of the bank; and it was thought a better anchorage would be found with the southern steeple W. ¾ N. and the northernmost fort North. The bottom being foul in many parts of the road, it is customary to buoy the cables from the ground. This road is exposed to easterly winds, but these seldom blow hard, although it has sometimes happened that ships have been driven from their anchors on shore. Santa Cruz is an excellent place for procuring a supply of cheap wines, which are of a weak quality. Vegetables are plentiful, also the fruits common in Europe, and good water is easily procured when the surf is not great on the beach. The Mole Head, Santa Cruz, is in lat. 28° 28′ 13″ N., and longitude 16° 14′ 35″ W. Santa Cruz. Anchorage. Refreshments.

Oratava, situated on the N.W. side of the island, has a very insecure Road, where ships stop sometimes to take in wine: the anchorage is in 50 fathoms, about 1½ miles off shore, with the Peak bearing S.W., and a pilot should be kept on board. Straggling rocks project two or three ships' lengths from the shore, on which the sea breaks furiously; this anchorage is very dangerous in the winter months, from September to May.—Lat. of the landing-place 28° 25′ N., lon. 16° 33′ W. Oratava.

CANARIA or GRAND CANARY, extending from lat. 27° 45′ to 28° 13′ N.; and 12 leagues S.E. of Tenerife, is nearly round, being about 11 or 12 leagues in extent; it is the best watered, and most fertile of the islands. Palmas, the chief town, Canaria or Grand Canary.

is on the N.E. side of the island; its Road is sheltered from the N.E. by a point of the land stretching out in a peninsula, and having some rocks adjoining.—Lat. of Mole Head, by Lieut. Arlett, R.N., 28° 7′ N., lon. 15° 25′ W.

Gomera.

GOMERA, about 5 leagues to the S.W. from the coast of Tenerife, is 6 leagues long, and its medium breadth 3 leagues. St. Sebastian, the chief place, is in a bay on the East side, sheltered to the northward by a projecting point. North Point, lat. 28° 13′ N., lon. 17° 16′ W. East Point (San Christoval), which is near Port San Sebastian, lat. 28° 6′ N., lon. 17° 6′ W.

Hierro or Ferro.

HIERRO or FERRO,* the south-westernmost of the Canary Islands, distant 10 or 11 leagues to the S.W. of Gomera, is 6 leagues long and 3 leagues broad. Puerto del Hierro, on its East side, is in lat. 27° 46′ N., lon. 17° 54′ W.

Fuerteventura.

FUERTEVENTURA is about 20 leagues long, and from 2 to 5 leagues broad, the S.W. point being in lat. 28° 3′ N., lon. 14° 31′ W., and the North point in lat. 28° 45′ N., and lon. 13° 54′ W.

Lanzarote.

LANZAROTE, or Lancerota, about 6 leagues long and 4 leagues broad, lies to the N.E. of Fuerteventura, being separated from it by the Bocayno channel, in which is the Island Lobos, 2 leagues long and ½ a league broad, dividing the channel into two passages. That between Lobos and Fuerteventura is 2 miles wide, with 5 fathoms water and good anchorage. The channel next Lanzarote is 4 miles wide, with 10 fathoms water. Off the north end of Lobos there is a large reef. The East Rock off the North end of Lanzarote is in lat. 29° 16′ N., lon. 13° 20′ W.

Harbours.

On the S.E. side of Lanzarote are two ports within reefs, called Puerto de Naos and Puerto de Cavallos; the former is the northern one, sheltered from N.E, by the reefs, and here vessels may refit. It has two entrances between the reefs, with only 14 feet at high water in the northern, and 17 feet in the southern entrance; the depth within is 27 to 10 feet; rise of tide 10 feet.

Puerto de Cavallos.

Puerto de Cavallos, 1 mile South of the former, has only 12 feet in the channel; and within, 17 feet.—Fort St. Gabriel at Arrecife, lat. 28° 57′ N., lon. 13° 23′ W.

Graciosa, Santa Clara, and Alegranza.

GRACIOSA, SANTA CLARA, and ALEGRANZA, are three small islands off the North point of Lanzarote; they are uninhabited and destitute of fresh water. The channel between Graciosa and Lanzarote forms the harbour of El Rio, in which the depth is 6 or 7 fathoms. The North point of Graciosa is in lat. 29° 17′ N., and lon. 13° 31′ W. The centre peak of Santa Clara is in lat. 29° 18′ N., and lon. 13° 32′ W. Alegranza North Point, lat. 29° 25′ N., lon. 13° 31′ W.

Channel within the Cape de Verde Islands.

Some outward-bound ships for India, or St. Helena, prefer the channel between Cape de Verde and the Cape de Verde Islands; keeping in longitude between 19° and 20° W. in passing the islands, to avoid some *doubtful* dangers placed to the eastward of

* This island was adopted by most of the European nations in the 17th and 18th centuries as the *First Meridian*, and is still used as such in many of the Swedish, Norwegian, and Russian Maps. Geographers, even of the same country, do not, however, appear to have been unanimous in their assumed Longitude of Ferro, but the English generally reckoned it 17° 40′ or 18° W. of London, and the French 20° or 20° 20′ W. of Paris. In the Swedish Charts of the late Admiral Klint, it is assumed 20° 30′ W. of Paris.

them, which seem to have no existence: other ships keep nearer to the continent, where the channel is clear, with soundings near the land. Were it not for great haze contiguous to the coast, occasioned by the dust and dry vapour, driven to seaward by the N.E. winds from the hot sandy desert, the passage within a moderate distance of the main would be preferable to that outside the Cape de Verde Islands, when the sun is far to the southward; for steady northerly winds then prevail near the continent, and the route is shorter than that to the westward. But the obscure atmosphere renders the inner passage unpleasant when observations are not regularly obtained, particularly if near the coast; for a dangerous reef of rocks, part of them above water, projects from Cape de Verde about a league to the westward. Capt. Bathie, in the Evander, in 1826, was set by the current into the deep bay on the North side of the Cape, and had no soundings with 100 fathoms line, about 3 miles off shore; the Cape bearing W.S.W. about 5 leagues distant; nor were any soundings got afterwards in passing within a few miles of the above-mentioned reef. Cape de Verde Reef.

THE CAPE DE VERDE ISLANDS, consisting of ten principal, and some small Isles, extend from lat. 14° 43′ to 17° 13′ N., and from lon. 22° 28′ to 25° 27′ W.; they are mostly high, and some of them have sheltered bays, with tolerable anchorage. Cape de Verde Islands.

ST. ANTONIO, the north-westernmost of the Cape de Verde Islands, is often seen by ships passing to the westward of them: prior to the use of chronometers and lunar observations, it was desirable to see this island, or Palma, or Madeira, in order to correct the reckoning; which is not requisite, if a ship have good chronometers; nevertheless, St. Antonio may be passed in sight, without fear of delay by calms or light winds, if not approached too close. By admeasurement, I made the summit of St. Antonio 7,400* feet above the surface of the sea, it may therefore be seen near 30 leagues from a ship's deck in clear weather, which is seldom the case, hazy or cloudy weather mostly prevailing about these islands. St. Antonio. Height.

Ponta de Sol, the North Point, which may always be known by several white houses on it, projects in a low sand, with a reef extending about ½ a mile farther into the sea, and 1¼ miles off the point, the Leven got no ground at 130 fathoms. From hence to the West end of the island, the coast should not be approached within 2 miles, for fear of calms. Between the North and N.E. points, a vessel should not come within 5 miles of the land, as she may have light winds, and be set on the island by the swell. By the survey of H.M.S. Leven, the North Point of the island is in lat. 17° 12′ N., lon. 25° 6′ W.; South Point, in lat. 16° 54′ N., lon. 25° 18′ W.; East Point, 17° 5′ N., lon. 25° 0′ W.; West Point, 17° 3′ N., lon. 25° 23′ W.† Position.

On the west side of the island there is a small Bight, called Tarrafal Bay, where excellent fresh water may be got, and anchorage in from 35 to 40 fathoms, about ¼ mile off the sandy beach at that part of the bay, where H.M.S. Leven remained some time in the summer of 1820: there was very little surf, the anchorage being protected from the N.E. trade wind by the mountainous land; and this sometimes produced a light sea breeze or eddy wind in the heat of the day. Tarrafal Bay.

This bay is known by a small green plantation, and a black sandy beach under a

* Captain Foster made it only a few feet in excess of the above.

† The Russian circumnavigator, Captain, now Admiral Krusenstern, made the S.W. point in lon. 25° 24′ W. Captain Lisiansky made it in lon. 25° 23′ W.; I made the summit of the island, by noon observation and chronometers, in lat. 17° 2′ N., lon. 25° 25′ W. Capt. Foster, in H.M.S. Chanticleer, in 1828, made the beach near the West Point in lat. 17° 1′ 4″ N., lon. 25° 15′ 5″ W.

cliff. The square sails should be furled, and all the boats made ready to tow a ship in when she is becalmed under the high land, and the jolly boat should be previously sent in and anchored in 30 fathoms as a guide, opposite to a red mark in the cliff.

Anchorage. The best anchorage is in 39 to 35 fathoms, about $\frac{1}{3}$ of a mile off shore, soft bottom, where a ship may lie very smooth under the mountain, with its altitude about 25°; northern extreme of the land bearing N. 11° W., southern extreme S. 25° W., red mark on the cliff S. 30° E. This bay is open from N. by W. to S.W. by S. Capt. Vidal made the Tent erected for observations on shore, in lat. 16° 57′ 10″ N., lon. 25° 24′ 48″ W.* Variation 16° W. (1820.)

* Lieut. Raper, R.N., adopts 25° 21′ 40″ W. as the longitude of Tarrafal Bay, and 25° 23′ W. for that of the West point. Lieut. Raper has recently devoted his attention to the discussion of the longitudes of the principal maritime points of the globe, and from the judgment and ability which he has displayed in the inquiry, every confidence may be justly given to his decisions which a necessarily imperfect data will warrant.

He has considered separately the *absolute* position of each place as afforded by astronomical observation, and the *relative* position as connected by chronometer with other points. The places are arranged in the order in which they are deduced from each other, and the evidence under each is disposed chronologically, by which arrangement the connection between them is clearly exhibited; so that whenever it may be found necessary to apply a correction of any kind to one or more places, the corresponding effect upon all positions connected with them may be immediately traced.

The entire discussion of this subject will be found in the Nos. of the Nautical Magazine for 1839 and 1840, in a series of papers, which are well worthy the attention of all who are interested in the improvement of hydrography. We here introduce a few brief remarks from them.

After giving an abstract of the principal voyages and surveys by which hydrography has been chiefly advanced, and considering the comparative value of the various methods employed in determining the longitude, Lieut. Raper notices the confusion which arises from navigators acting too independently of each other, in giving new determinations to points fixed by their predecessors. By this unsystematic mode of proceeding, he observes, "Many principal stations, together with the numerous points depending on them, are in perpetual change. Nor is this all, for as navigators do not agree in referring the same places to the same principal station, the determinations of the same place by different navigators cannot be directly compared."

To remedy these evils, he proposes to select certain stations as fundamental points, calling their meridians *Secondary Meridians*. The longitudes of these points would be assumed as given, and each navigator should be instructed to refer all his positions to them, directly or indirectly, as opportunity offered.

When a point is once agreed upon for a secondary meridian, any other point well determined from it will equally serve for extending the connection to more distant places. "Thus, Capt. Horsburgh having adopted the Grand Ladrone as the principal, or as we should call it, the secondary meridian of the China Sea, connected with it Pulo Aor, about 1,300 miles distant, and 9° 10′ 20″ W. as given by 20 chronometers agreeing within 2′ of each other; whence Pulo Aor has itself become a position of nearly equal value with the Grand Ladrone." In this way the islands of the Eastern Sea would by degrees be connected with one another, and agreement would be introduced among their relative positions, which never could result but by accident from chronometric measures taken sometimes from places connected with others, and sometimes from places independently fixed.

"The absolute longitudes of these points would be of secondary importance, since consistency among the several places is of far more consequence than their absolute positions. The longitudes would be adjusted in the course of time, but no alterations should be suffered until unequivocal proofs had been accumulated of the necessity of applying corrections."

The number of secondary meridians would of course be indefinite. The following are some of the places submitted by Lieut. Raper as the chief points to which in general all other places in the South Atlantic and Eastern Seas should ultimately be referred, and which are at such distances from each other as to require that they should themselves finally depend on astronomical observation:—

| | | |
|---|---|---|
| Rio de Janeiro, Fort Villegagnan, | for the | East Coast of S. America. |
| Cape of Good Hope, Observatory, | ,, | South Coasts of Africa. |
| Mauritius, Cooper's I. Port Louis, | ,, | Indian Ocean. |
| Bombay, Observatory, | ,, | W. Coast of India, Arabia, and Red Sea. |
| Madras, Observatory, | ,, | E. Coast of India and Bay of Bengal. |
| Batavia, Observatory, | ,, | Java and adjacent Islands. |
| Canton, Factories, | ,, | China Sea and Coasts. |
| Paramatta, Observatory, | ,, | Australia. |

The channel between St. Antonio and St. Vincent is safe: the Lord Eldon passed through it in July 1802, and thought it nearly 5 leagues broad. In passing through, you may be guided by your eye to keep clear of the light winds occasioned by either island. Channel between St. Antonio and St. Vincent.

ST. VINCENT, 7 miles S.E. of St. Antonio, is about 12 miles long from East to West, and 7 broad, having two chains of mountains running parallel to its South and N.E. sides, with a valley in the centre, at the N.W. opening of which is the bay of Porto Grande—the best anchorage in the Cape de Verdes. Here is security from the sea, with a fresh breeze generally blowing, and as much wood may be cut in a short time as can be stowed away, and a ship may be refitted with safety. The harbour is open to the westward; but St. Antonio, being only 9 miles distant, always shelters it from the wind in that direction. Water may be got from the well, sufficient for daily use, and when refitted, a ship may run down in 5 or 6 hours to Tarrafal Bay, in St. Antonio, and there complete her water. A few lean cattle may also be procured.* St. Vincent.

St. Vincent *is said* to have anchorage all round. The Devonshire, on her passage to India, in 1766, found anchorage in a bay on the S.W. side of the island, about $2\frac{1}{2}$ or 3 miles off shore, in 22 fathoms water, with a bottom of sand and bits of coral. She estimated her distance from each extreme of the land at about 4 miles. One well was discovered, and another dug near it at the head of this bay, where she filled up her water during a stay of several days.

The North Point of St. Vincent is in lat. 16° 54′ N., lon. 24° 59′ W. South Point in lat. 16° 47′ N., lon. 25° 2′ W. East Point, 16° 50′ N., 24° 55′ W. West Point, 16° 50′ N., 25° 8′ W. Porto Grande Custom House, 16° 53′ N., 25° 0′ W. Bird Island, 16° 55′ N., 25° 2′ W.

ST. LUCEA, about 5 miles E.S.E. from St. Vincent, is about 6 miles long from N.W. to S.E., of an irregular shape, hilly, and occasionally inhabited by fishermen. Its South shore, which runs in an East and West direction, is fronted by a bank, extending $\frac{1}{2}$ a mile from the shore, on the edge of which are 2, 3, and 4 fathoms. It then suddenly deepens to 8, 9, and 10 fathoms, and the soundings slightly increasing in depth, are carried across to Branco Island. There is a good landing place near the middle of the South shore of Lucea, and there is a well of fresh water near a ruined village on its S.W. side, W.S.W. from the little islet of Leon. St. Lucea.

In the Channel, South of Lucea, the flood runs to the westward, and the ebb to the eastward, about 2 miles an hour at spring tides, but the wind has great influence on them. On full or change of moon, it is high water about one o'clock. In this channel Tides.

Lieut. Raper's 4th paper, "On the propriety of adopting a uniform method of placing on record Chronometric determinations" (N. Mag. June 1839), is especially worthy the attention of navigators. We will here quote the particulars which he recommends as necessary to be inserted in a register of chronometric measurements.

"1. The exact spot of observation. 2. Whether the observations were made by the sea horizon or by the artificial horizon on shore. 3. The number of days elapsed between the observation for time, or the number of days employed in the passage between any two places—or both, if these periods differ much. 4. The number of Chronometers—the maker's name and number of each being noted. 5. The result shewn by each Chronometer, and, to facilitate the estimation of the general dependence which may be placed on each determination, the difference of the extreme results."

* The ship Lonach, commanded by Lieut. Cotgrave, R. N., anchored and remained here from the 25th of December, 1829, to January 1st, 1830, and could not procure any refreshments, excepting a few small bullocks, brought from the mountains by the natives. Neither fruit, vegetables, nor any good water could be obtained; a small quantity of the latter was got by digging, and also from a little well; it was not drinkable, being muddy, and soon became putrid, but it was given to the live stock.

border not too close to the eastward of St. Lucea, the ground being uneven. There are soundings 2 or 3 miles to windward of St. Lucea, with discoloured water. Between St. Lucea and St. Vincent there is a channel, through which the Leven passed; and here, when blowing fresh, with the tide setting to windward, it has the appearance of shoal water, but she did not find less than 6 fathoms in working through, with 15 fathoms in mid-channel. The North Point of St. Lucea is in lat. 16° 49′ N., lon. 24° 48′ W. South Point in lat. 16° 43′ N., lon. 24° 48′ W. East Point in 16° 45′ N., 24° 43′ W. West Point in 16° 47′ N., 24° 50′ W.

Branco. BRANCO, in lat. 16° 40′ N., lon. 24° 42′ W., is about two miles long and three-quarters of a mile broad, inaccessible excepting in fine weather. A low sandy point projects a short way from its S.E. end, with a reef off it, which is visible. The Leven beat through the passage between this island and Raza, and had irregular soundings. She also went through between Raza and St. Nicholas, which is a good passage, but the tides and currents between these islands are sometimes strong and irregular, greatly influenced by the winds, rendering a good look out necessary when near them.

Raza. RAZA, in lat. 16° 38′ N., lon. 24° 38′ W., is a small uninhabited island, about 1½ miles in diameter, at times inaccessible: there is no fresh water on it, and the bottom near it is rocky. The landing place is near its N.W. point.

St. Nicolas. ST. NICOLAS, about 5 leagues S.E. of St. Lucea, may be seen 16 leagues in clear weather: it is the most pleasant of these islands, and the residence of the bishop; on the South side, there are several indifferent anchoring places. Grand, or St. George Bay, where the trade of the island is carried on, is on the western side of that large bight formed by the East and South points of the island. It has anchorage in 7 fathoms clear ground, close to the shore; but out in 9 and 10 fathoms the ground is rocky. Here refreshments may be procured, but there is no watering place for a ship.

This Bay may be known by the White Fort, which stands on a hill, and which is seen immediately after rounding the South point of the island from the westward; but ships requiring refreshments generally stand off and on, the anchorage being very close in. The chief town is about 4 miles inland from the landing place, and there the bishop and governor reside. Between the South and West points of the island is Tarrafal Bay, near the S.E. shore of which is the custom-house. Soundings extend from this bay off the shore, about a mile towards the West point, which is low and rocky. A ship might anchor here in the calm to repair damage, about three miles to the southward of the West point, the breeze not reaching so far down, excepting in the rainy season, when it would be dangerous, as the wind then comes in from the southward. Close in shore here, if blowing strong outside, the tide will run 9 or 10 hours to the northward. (Tides.) H.M.S. Leven anchored twice here, in 18 fathoms, the West Point bearing N. 16° E. off shore 1 mile. The North Point of St. Nicolas is in lat. 16° 41′ N., lon. 24° 21′ W. South Point in lat. 16° 28′ N., lon. 24° 20′ W. East Point in 16° 34′ N., 24° 3′ W. West Point in 16° 38′ N., 24° 28′ W.

Sal. SAL is high and bold, with two peaks on it, and may be seen 14 or 15 leagues in clear weather. The easternmost peak is highest, and the land between them being low, they appear like two separate islands when first seen.

In passing along either side of the island to the southward, a ship should not

approach too close to the South Point, which is low, extending out several miles in a sandy spit, not visible in the night, nor in hazy weather. The North Point is in lat. 16° 51′ N., lon. 22° 56′ W. The South Point in lat. 16° 34′ N., lon. 22° 57′ W. East Point, 16° 40′ N., 22° 57′ W. West Point, 16° 48′ N., 23° 4′ W., by the survey of the Leven.*

Mordeira Bay, on the west side of the island, affords tolerable anchorage, excepting in the rainy season, when the wind comes from the southward at times; but a chain should be used, the bottom being foul ground: neither wood nor water is to be got here for shipping. Mordeira Bay.

BONAVISTA is high, very uneven, composed of alternate hills and vallies, and in some places low points project into the sea; the eastern extreme in particular, is a low projecting point, not discernible until near it. From this low point, a reef of rocks with foul ground extends a mile or more to seaward; and also to the northward of this point, about two miles from the shore, are several rocky islets, terminating off the N.E. point in an extensive reef, on which the outward-bound East-India ship, Hartwell, was wrecked, with loss of cargo and most of the treasure. The Resolution, Captain Cook, in her voyage to the South-Sea, was nearly sharing the same fate in the night, owing to a southerly current; and several other ships have suffered on this reef.† Bonavista.

In thick or misty weather, great care is necessary when approaching this island, as the currents are sometimes strong and irregular; and the fine sand or dust blown off from the desert of Africa, makes the atmosphere frequently so thick, that the land cannot be seen before you are in the surf. The N.W. Point of the island is in lat. 16° 13′ N., lon. 22° 59′ W. The South Point in lat. 15° 57′ N., lon. 22° 52′ W. N.E. Point in 16° 11′ N., 22° 47′ W. West Point in 16° 2′ N., 23° 2′ W.

There is anchorage here in English Road, Portuguese Road, and off the Coral Reef; but there is no town except at English harbour, where you may anchor inside or outside of the reef off the small island, but it is often dangerous to remain at anchor, more particularly about the full and change of the moon, when heavy rollers generally prevail about the island. English Road.

LETON ROCK, OR REEF, is very dangerous, and much in the way of ships passing to the westward of Bonavista. There *seems to be* another reef considerably to the northward of the Leton Rock, and much nearer to Bonavista. These dangers render the channel to the westward of Bonavista unsafe in thick weather, or in the night; for it is thought the sea does not break on these reefs with smooth water, but when there is much swell, breakers roll over them. Leton Rock.

* To the N.N.E. of the island of Sal, in lat. 18° 40′ N., lon. 21° 28′ W., a shoal is said to have been lately seen by a French ship, but its existence seems very doubtful.

† Captain Vidal, in 1838, when returning from his survey of the coast of Africa, with the Etna and Raven under his command, took an opportunity of searching for the Bonetta, Madeline, and other shoals, said to exist to the Eastward of Bonavista. He states that the sea between the Meridian of 19° W. and the Island of Bonavista was traversed with attention, and that a vigilant look-out was kept at the mast heads of both vessels. The deep sea lead was kept going night and day, and when near the positions assigned to the dangers, the hand lead also; but that no bank of soundings could be found, or any appearance of breakers. The spots recorded by the masters of the Madeline and Wave, (lat. 16° 19′ N., lon. 22° 19′ W., and Bonavista bearing W. by S. 7 leagues) were frequently passed in full daylight. Captain Vidal found the current generally setting to the S. W. from 10 to 15 miles a day—many ripplings indicating its direction, and the sea being much discoloured, as if in soundings. To these currents, he thinks, may be safely attributed the loss of the Hartwell; it is also his opinion that the vessels reported to have been wrecked on the Bonetta and Madeline rocks were, in fact, lost on the dangerous shoals which bound the N.E. end of Bonavista.

The London, in June 1795, saw the northernmost breakers: after passing to the westward of Sal, she saw Bonavista, bearing S.E. by S. 7 or 8 leagues; from hence, she steered by compass S. $\frac{1}{2}$ W. $6\frac{1}{2}$ miles, S. by E. $5\frac{1}{2}$ miles, S. by W. $6\frac{1}{2}$ miles, being then 4 P.M., saw from the deck breakers, bearing from S.S.E. $\frac{1}{2}$ E. to S.E., distant 6 or 7 miles; steered S. by W. $\frac{1}{2}$ W. $6\frac{1}{2}$ miles to 5 P.M., the breakers then distant $3\frac{1}{2}$ miles to the eastward.

The Diana, in October 1805, passed near the Leton or Southern Reef. At 1 P.M., October 21st, Bonavista E.S.E. 7 or 8 leagues, steered S. by W. 6 miles, S. by W. $\frac{1}{2}$ W. 12 miles, being 4 P.M.; breakers first seen at 3 P.M. now bore E.S.E. 4 miles.

By the relative positions of these ships from Bonavista, and their courses steered till near the breakers, the danger seen in the Diana appears to be about 4 leagues to the southward, and considerably to the westward of that seen in the London, if these were both *real* dangers.

The danger of running in the vicinity of these reefs in the night has been fatally experienced by the loss of the Lady Burgess, one of the outward-bound India fleet, which ship struck among the breakers on Leton Rock, at 2 A.M. 19th of April 1806. The Alexander, Sovereign, Lord Nelson, and other ships of the fleet, narrowly escaped after the breakers were perceived close aboard. The Lord Melville struck three times, and slipped off the rocks into 25 fathoms, at the time the Lady Burgess was observed standing directly among the breakers. It appears from the journals of the fleet, combined with information received from several of the commanders, that the Leton Rock, or Reef, is composed of coral, no part of it above water. Captain Swinton, late commander of the Lady Burgess, thinks that the extent on which a ship would strike is not above a cable's length, and that there are no breakers on it in fine weather. To the northward it is steep to, but this danger seems to be the northern limit of a bank of coral soundings, which extends a great way to the southward, and a considerable distance to the eastward and westward. The Asia had 52 fathoms coral at daylight, when the breakers and wreck of the Lady Burgess bore E. by N., distant about 6 miles, and other ships had soundings from 25 to 50 fathoms to the West and S.W. of the reef at 2 to 5 or 6 miles distance. Directly after striking, the Lord Melville had 25 fathoms, with her head to the eastward, and shortly after 30 fathoms; she hove to, with her head easterly, until daylight, and had from 30 to 40 fathoms, all coral soundings. Some of the other ships carried soundings on Leton Bank for 10 or 12 leagues to the southward of the rock, generally coral, sometimes intermixed with sand and shells, and never had less than 20 fathoms. By means of the observations and chronometers of the fleet, Leton Rock is in lat. 15° 49′ N., lon. 23° 14′ W., and the survey of H.M.S. Leven placed it in lat. 15° $47\frac{1}{2}$′ N., lon. 23° 10′ W. Captain Cook, bound to the South Sea on discovery, had soundings 60 fathoms, the Island of Mayo bearing S.S.E. 5 leagues; these soundings were probably on the southern extremity of Leton Bank, as he had previously seen the breakers on the rock, after passing Bonavista on the East and S.E. sides.

If an outward-bound ship intend to stop at Porto Praya, in the island St. Jago, which is frequented by ships in want of water, it will be prudent to steer for Sal, or Bonavista, and to avoid the danger to the westward and south-westward of the latter, she may pass on the East side of these islands; or on the West side of Sal, if the wind be far from the northward, then well to the westward of the shoals, and afterwards for Isle Mayo, passing also to the westward of it, she will easily reach Porto Praya Road. If the wind incline from eastward, to pass to windward of them will be most convenient for reaching Porto Praya with speed. In running for these islands

it is proper to look out in time, the current generally setting to the southward amongst them, sometimes strong.

MAYO or MAY ISLAND, bearing from Bonavista nearly S.S.W., distant 14 or 15 leagues, has a reef of rocks projecting N.E. from the North end about 2 miles; and this being a low point, makes it unsafe to approach in the night. There are 45 fathoms coral 5 or 6 miles to the northward of this reef, and the soundings extend to Leton Rock, and from thence to the coral reef off Bonavista. This island may be seen 10 or 11 leagues, being high at the centre, uneven, making in hills, and has anchorage under the S.W. end in 7 or 8 fathoms, in a kind of bay, called English Road. The shore to the eastward, and abreast the town of Mayo, is steep, bluff, and rocky; but to the westward, a low white sandy beach extends to a rounding point, from which a spit of sand and coral stretches out a few cables' lengths, and at a small distance from which, there is no ground at 40 and 50 fathoms. This spit may be rounded in 17 to 15 fathoms, and a ship should not anchor in the Road farther out than 16 or 17 fathoms, as these depths are on the edge of the bank. A vessel may anchor at the South side of the island, and in several other places, but there is no town except at English Road. The cattle are better here than at any of the other Cape de Verde Islands, perhaps by their access to the Salt Pans. Salt is produced in great abundance, and a number of American ships load with it annually. No wood is to be obtained for shipping. The North point is in lat. 15° 19′ N., lon. 23° 14′ W. South point in lat. 15° 6′ N., lon. 23° 9′ W. East point in 15° 14′ N., 23° 8′ W. West point in 15° 10′ N., 23° 16′ W. Mayo Island. English Road. Supplies.

Mayo should be passed on its eastern side if the wind be from the eastward, but with the wind inclining from northward or N. N. W., it should be passed on its western side.

ST. JAGO, or YAGO, the chief of the Cape de Verde Islands, is about 32 miles long and 15 broad; it is mountainous and *generally* sterile, but having some fertile spots which produce fruit and vegetables. Porto Praya, the most important harbour in Cape de Verdes, is situated near its South extreme. St. Jago.

The S. E. point of St. Jago appears low, when seen either from the northward or southward, and projects considerably into the sea; and to the S.W., about 7 miles from it, is Porto Praya, the principal port in the Island St. Jago. Between the East point of Praya Bay and the S. E. point of the island, about 3 or 4 miles to the westward of the latter, St. Francis Bay, resembling that of Porto Praya, is situated; having a brown sandy beach, with several date trees and houses at the bottom of it. Some vessels have been in danger by mistaking this bay of St. Francis for that of Porto Praya, the East points of both being fronted by sunken rocks. Porto Praya, however, is between 4 and 5 miles farther to the S. W.; the intermediate coast being mostly perpendicular, and approachable within 1½ miles in 10 fathoms water. Approach to Porto Praya.

The Fort, situated on a small cliff in Porto Praya, is a mark by which that bay may be distinguished from St. Francis; another mark is, that the North or East point of the latter is generally surrounded with breakers, whereas the East point of Praya Bay is high, steep, and free from danger; and its West point has a battery of earth or brown stones on it, by which the bay is often first distinguished, and the sea always breaks off this West point to some distance. In running for this place with a brisk N. E. wind, a ship should have a reef or two in her topsails when she approaches the East point of the bay, and this point may be passed within the distance of a cable's length,

in 8 or 9 fathoms; the same distance from the eastern side of the bay, in 7 or 8 fathoms, is proper in sailing to the anchorage. The eastern shore of the bay is high, and all the land seems parched and barren.

Porto Praya.

Porto Praya is a fine bay; the two points which form it, bear from each other about W. $\frac{1}{2}$ N. and E. $\frac{1}{2}$ S. $1\frac{1}{2}$ or $1\frac{3}{4}$ miles distant, and it is of equal depth. After passing the east point, the fort at the bottom of the bay soon opens; to the westward of which, in a valley, are several date trees, and a small house. A small black island, flat at the top, called the Isle of Quails, is situated in the West side of the bay, having a rocky projection from its South end about half a cable's length; there is also a rocky ledge off the North end, where the water is in general shoal, for 3 fathoms is the greatest depth between this isle and the fort. Between it and the shore the channel is only navigable for boats. From the West point of the bay some rocks extend to seaward, and it requires care to avoid them in sailing from the anchorage in the night.

Anchorage.

The best anchorage is, to bring the fort N. W. $\frac{1}{2}$ W. about 1 mile, the East part of Isle of Quails W. by S. or W. by S. $\frac{1}{2}$ S. $1\frac{1}{4}$ miles, in 7 or 8 fathoms; but nearer to the N. E. side of the bay is more convenient to weigh from in light winds, or otherwise, to prevent being carried near the point of rocks to leeward by the currents, before a ship has good way through the water. The Earl Talbot, in $7\frac{1}{2}$ fathoms, black sand, had the flag-staff on the hill N. W. by N.; Jubaroon Point, or West extreme of the bay, S.W. by S.; South extreme of Quail Island W. by S. $\frac{1}{2}$ S.; and the East point of the bay E. S. E. $\frac{1}{4}$ S.; off the landing place 1 mile; off the N. E. shore 2 cables' lengths.

Winds and weather.

The winds are generally in the N. E. quarter, and frequently the weather is cloudy with squalls; rain seldom falls, excepting in July, August, and September, but a dry haze mostly prevails about these islands. In December and January the winds keep sometimes far to the eastward, but they veer at times in the same season to the northward.* In July, August, September, and October, strong southerly winds are liable to happen at times, blowing two or three hours, and forcing a heavy swell into the bay, which frequently breaks, rendering the anchorage rather dangerous at this season: therefore ships at this time should anchor well outside of Quail Island, in order to clear the land in getting under weigh, or if obliged to slip and proceed to sea. But these southerly gales do not happen every year.

Supplies.

The cistern which supplies the ships with water in Porto Praya Bay is at the bottom of the hill upon which the castle is built, about $\frac{1}{4}$ mile from the beach, and in common seasons, if drawn dry in the evening, is full again next morning, but in very dry seasons the supply is scanty. The water is not very good, being more or less brackish.† At such times there is a scarcity of all the necessaries of life, and the wretched natives perish in great numbers by famine. This is usually an indifferent place for a ship to procure refreshments, but sometimes pigs, goats, poultry, oranges, limes, and pine-apples are plentiful at moderate prices, and Spanish dollars or Portuguese coins are best to pay for a supply of refreshments. The anchorage in the Bay of Porto Praya is in lat. 14° 55′ N., lon. 23° 30′ W., by mean of many ships' observations and chronometers. Variation 16° West in 1820. The survey of H. M. S.

* When the weather is settled, there are often regular land and sea breezes in the Bay of Porto Praya; the sea breeze setting in near noon, with a great surf on the shore, and ending at four or five o'clock in the afternoon. The N.E. wind sets in towards evening, and continues during the night.

† As there is generally some surf on the beach, boats should lie at their grapnels, and the casks of water be hoisted into them, after being filled at the well or cistern, and rolled down and floated through the surf. His Majesty's ships Polyphemus and Africa, with a fleet of transports, watered at this place in January 1807, and found the water then very good. Capt. Heywood advises large ships to send on shore a pump to place in the well, by which they

Leven made Quail Island in lat. 14° 53¾′ N., lon. 23° 31¼′ W.* North point of the island in lat. 15° 20′ N., lon. 23° 47′ W. S.W. point in lat. 14° 58′ N., lon. 23° 44′ W. East point in 15° 0′ N., 23° 26′ W. West point in 15° 17′ N., 23° 50′ W.

FOGO, OR ST. PHILIP, about 5 leagues in extreme length and nearly circular, is very high, forming a volcanic peak, and generally clouded. A ship may anchor off the town of Luz, which is on its West side; but the water is very deep, with a great surf on the beach, and the landing difficult. Fruit may be got in the season, but there is no water for the supply of shipping. There are a few mulatto or negro inhabitants, who raise vegetables, and rear goats and cattle. At the North and N.E. points of the island the currents are strong, influenced by the strength of the winds outside: by approaching these points close, vessels are liable to light winds, under the high land. The North point of the island is in lat. 15° 2′ N., lon. 24° 26′ W. South point in lat. 14° 49′ N., lon. 24° 25′ W. West point in 14° 54′ N., 24° 34′ W. Peak in 14° 57′ N., 24° 22′ W. Fogo. Currents.

BRAVA, 9 miles to the westward of Fogo, is high, about 4 leagues in circuit, and one of the most fruitful of the group. Porto Furno, on the East side, is a good harbour for small vessels, with a narrow entrance, which obliges ships to warp out. Brava.

Porto Furreo, on the South side, and Porto Fagen Dago, on the West side, are said to afford good shelter for small vessels, where water and refreshments may be procured; but this island has no safe anchorage for large ships, neither can wood nor water be got for such ships.

The north point of the island is in lat. 14° 52′ N., lon. 24° 44′ W. South point in lat. 14° 47′ N., lon. 24° 45′ W. East point in lat. 14° 51′ N., lon. 24° 43′ W. West point in 14° 51′ N., 24° 48′ W. There are two islets, with rocks between them, about 5 miles N.N.E. from the North end of Brava.

will be sooner watered than if the water were drawn up from it in the common manner with buckets. Some planks carried on shore will be useful to place under the casks in rolling them down, where the ground is stony or uneven, or where it is soft sand, which is often the case. The harbour-master will supply ships with water at the rate of a dollar per butt of 100 to 140 gallons, taking the empty casks from alongside in his boat, and returning them full.

* Lieut. Raper adopts 23° 30′ 45″ W. for the lon. of Quail Island.

# A TABLE

## DENOTING THE EQUATORIAL LIMITS OF THE TRADE WINDS BETWEEN AFRICA AND AMERICA, EXPERIENCED IN EVERY MONTH OF THE YEAR.

THIS TABLE, formed by a close investigation of the East India Company's ships' journals, will readily be comprehended without any explanatory description; it may, however, be proper to observe, that the limit of the N.E. trade, marked in the table, is the place where the wind was found steady between North and East; and the limit of the S.E. trade is the position where the wind was experienced settled between East and S.S.E. The winds which blow between S. by E. and S.S.W. to the northward of the equator, and the same winds which prevail from the equator to several degrees of South latitude near the African coast, are not marked as part of the S.E. trade, but are included in the space of variable winds between the trades. These southerly and S.S.W. winds, adjacent to the S.E. trade, prevail through several degrees of latitude, generally speaking; but are most settled when the sun is in the northern hemisphere, particularly in June, July, August, and September; his rays having, in these months, greatly heated the northern regions, draw the southerly winds far to the northward of the equator. In this season, the progress of outward-bound ships to the southward is greatly obstructed between the trades by the southerly winds and N.W. currents, which frequently attend them.

Many of the ships mentioned in this table were in company with fleets, it being a period of war great part of the time. The longitude is by chronometers, or lunar observations.

EXTRACTED FROM 238 EAST INDIA COMPANY'S SHIPS' JOURNALS,

TO SHEW THE

# EQUATORIAL LIMITS OF THE ATLANTIC TRADE WINDS.

| Year. | Outward-Bound Ships. | Lost N. E. Trade. | | | S.E. Trade began. | | | Remarks on Winds, &c. between the Trades. |
|---|---|---|---|---|---|---|---|---|
| | | Month. | Latitude. | Longitude. | Month. | Latitude. | Longitude. | |
| | | | ° ′ | ° ′ | | ° ′ | ° ′ | |
| 1794 | Nancy | Jan. 21 | 10 30 N. | 14 0 W. | Feb. 17 | 8 0 S. | 6 0 E. | Had S.W. winds near the African Coast Veered to South in lat. 8° S. |
| 1795 | Swallow | 29 | 10 30 | 18 0 | 24 | 4 0 | 2 30 | Had S.W. and S.S.W. winds till in lat. 4½° S. they veered to S.S.E. gradually. |
| 1799 | Taunton Castle | 24 | 5 0 | 22 0 | Jan. 31 | 2 0 N. | 22 30 W. | |
| 1802 | Arniston | 24 | 7 0 | 16 0 | March 5 | 9 0 S. | 1 0 E. | Had calms and faint airs to equator, and S.S.Westerly winds in South latitude. |
| 1803 | Royal George | 30 | 7 0 | 15 0 | Feb. 25 | 9 30 | 1 30 | S.W. winds from 4½° lat. to 7° S. then veering gradually to S. & S. by E. |
| 1792 | Rockingham | Feb. 6 | 7 0 | 21 30 | 17 | 0 30 N. | 24 0 W. | Southerly and variable winds. |
| 1792 | Ganges | 26 | 10 0 | 21 30 | March 7 | 2 0 | 21 30 | Variable. |
| 1792 | Lord Macartney | 26 | 11 0 | 20 30 | 8 | 2 30 | 20 0 | From 11° to 6° N. had N. W. winds. |
| 1793 | Royal Charlotte | 1 | 8 30 | 16 12 | 9 | 11 0 S. | 1 0 | Light S.W. wind from leaving Cape Palmas, 12th Feb. and afterwards S. by W. & S.S.W. |
| 1793 | Triton | 3 | 5 30 | 21 0 | Feb. 11 | 1 0 N. | 18 30 | Variable winds mostly at southward. |
| 1793 | Woodcot | 3 | 7 0 | 21 30 | 10 | 1 0 | 20 30 | N. Westerly and variable winds. |
| 1800 | Arniston | 13 | 6 0 | 21 0 | 27 | 1 0 | 21 0 | Variable. |
| 1801 | Rose | 25 | 9 30 | 23 0 | March 5 | 2 30 | 20 0 | |
| 1803 | City of London | 21 | 8 30 | 16 40 | 27 | 7 0 S. | 2 0 E. | Had N. & N. Westerly airs to lat. 5° N.; then S. W. & S.S.W. light winds to 6° South lat. |
| 1792 | Europa | March 14 | 8 1 | 21 0 | April 3 | 1 0 N. | 22 0 W. | Southerly and variable. |
| 1792 | Middlesex | 10 | 4 40 | 23 0 | March 18 | 1 0 | 23 0 | Variable. |
| | Sir Edward Hughes | 10 | 8 30 | 22 30 | 19 | 2 0 | 22 0 | |
| | Earl Weycombe | 15 | 6 30 | 21 0 | 27 | 1 30 | 22 0 | |
| | Duke of Buccleugh | 29 | 6 0 | 20 0 | April 12 | 2 30 | 22 30 | Variable and Southerly. |
| | General Goddard | 22 | 5 0 | 21 30 | March 27 | 2 0 | 22 0 | |
| | Valentine | 31 | 7 30 | 14 30 | May 3 | 4 0 S. | 5 30 E. | Calms & S.W. breezes in N. lat. & S.S. Westerly from equator to 6° South. |
| 1796 | Georgina | 18 | 10 0 | 18 0 | April 25 | 5 26 | 3 0 | N.W. & variable winds to 1° lat. South; then S.S. Westerly to 5° South. |
| 1797 | Sir E. Hughes | 24 | 2 0 | 19 30 | March 29 | 2 0 | 17 30 W. | Variable. |
| 1798 | Bombay Castle | 25 | 2 20 | 20 0 | 31 | 0 30 | 22 0 | |
| | Earl Howe | 25 | 2 30 | 18 0 | April 4 | 0 0 | 21 0 | |
| 1802 | Marquis of Ely | 12 | 4 0 | 22 0 | March 21 | 2 0 | 24 0 | |
| | Canton | 14 | 3 30 | 23 0 | 25 | 4 0 | 25 0 | N. Westerly and variable. |
| | Cirencester | 20 | 4 0 | 23 0 | 25 | 0 0 | 23 0 | Northerly. |
| 1802 | L. J. Dundas | 27 | 7 0 | 24 0 | April 10 | 3 0 | 19 0 | Variable. |
| 1802 | David Scott | March 22 | 6 30 | 17 0 | April 8 | 5 0 | 9 0 W. | S. Westerly light, variable, and calms. |
| | Marquis Wellesley | 25 | 8 0 | 23 0 | 7 | 3 40 N. | 17 0 | Variable. |
| 1803 | Carmarthen | 11 | 3 30 | 21 0 | March 17 | 0 28 S. | 22 0 | |
| | Walpole | 25 | 4 20 | 22 0 | April 5 | 0 0 | 21 0 | |
| 1804 | Windham | 16 | 2 30 | 21 40 | March 24 | 0 0 | 23 15 | |
| 1803 | Experiment | 12 | 3 0 | 21 30 | 14 | 0 36 N. | 21 20 | |
| 1804 | Sir Edward Hughes | 6 | 6 0 | 18 0 | 16 | 0 20 S. | 13 0 | Variable. |
| | David Scott | 31 | 13 0 | 18 0 | April 11 | 3 30 | 21 30 | N. Westerly and variable. |
| 1792 | Melville Castle | April 1 | 6 0 | 24 0 | 5 | 3 30 N. | 25 0 | Variable. |
| | Duke of Montrose | 5 | 5 30 | 21 0 | 16 | 0 30 | 22 0 | |
| 1794 | Duke of Buccleugh | 20 | 11 30 | 19 0 | June 9 | 4 0 S. | 7 0 E. | Calms and S.W. winds from 5° N. to 3° S. and S. by W. near Anna Bona. |
| 1795 | Arniston | 27 | 4 0 | 18 0 | May 6 | 1 30 | 15 0 W. | S.W. and S.S.W. winds. |
| 1797 | Rose | 11 | 4 0 | 20 0 | April 15 | 1 0 N. | 20 0 | Variable. |
| 1798 | Walpole | 17 | 8 0 | 21 30 | 27 | 2 8 | 22 0 | |
| 1800 | Lord Nelson | 15 | 4 0 | 21 0 | 20 | 1 30 | 23 0 | |
| 1801 | Lord Duncan | 28 | 4 0 | 25 0 | May 1 | 1 0 | 25 0 | Variable at Northward. |
| 1802 | Lord Nelson | 8 | 3 36 | 20 0 | April 20 | 1 0 | 20 0 | Variable. |
| 1803 | Huddart | 13 | 7 0 | 16 0 | 30 | 1 0 | 13 20 | South and S. Westerly. |

| Year. | Outward-Bound Ships. | Lost N.E. Trade. Month. | Lost N.E. Trade. Latitude. ° ′ | Lost N.E. Trade. Longitude. ° ′ | S.E. Trade began. Month. | S.E. Trade began. Latitude. ° ′ | S.E. Trade began. Longitude. ° ′ | Remarks on Winds, &c. between the Trades. |
|---|---|---|---|---|---|---|---|---|
| 1804 | Lord Nelson | April 15 | 6 0 N. | 24 0 W. | April 20 | 2 0 N. | 25 0 W. | |
| | L. J. Dundas | 15 | 5 25 | 25 0 | 20 | 2 0 | 26 0 | |
| | Fame | 22 | 5 28 | 21 30 | 29 | 3 0 | 21 0 | |
| 1805 | Walpole | 8 | 1 40 | 21 0 | 14 | 0 0 | 21 0 | |
| | Charlton | 15 | 3 30 | 17 30 | May 3 | 2 30 S. | 21 0 | |
| 1791 | Kent | May 5 | 5 20 | 20 0 | 8 | 3 30 N. | 21 0 | |
| | Dublin | 28 | 6 25 | 25 0 | 29 | 6 0 | 25 30 | No light winds. |
| 1792 | Lascelles | 2 | 7 0 | 21 0 | 7 | 4 0 | 17 0 | Variable. |
| 1792 | Sullivan | 4 | 6 0 | 22 30 | 11 | 2 30 | 20 0 | Variable and Southerly. |
| | Rose | 17 | 6 0 | 24 0 | 25 | 2 30 | 26 0 | |
| | Busbridge | 18 | 7 0 | 22 0 | 25 | 2 0 | 25 0 | |
| 1792 | Thetis | 30 | 10 0 | 19 30 | June 17 | 2 0 S. | 25 0 | Southerly. |
| 1793 | Exeter | 6 | 9 0 | 21 30 | May 25 | 4 0 N. | 20 0 | |
| 1796 | Canton | 7 | 13 0 | 19 30 | 23 | 0 30 S. | 24 0 | |
| 1797 | Ceres | 5 | 4 0 | 20 0 | 13 | 1 30 | 22 30 | Southerly and variable. |
| 1798 | Contractor | 31 | 8 0 | 25 30 | June 9 | 5 0 N. | 20 0 | |
| 1799 | Glatton | 4 | 6 0 | 18 0 | 27 | 7 30 S. | 5 0 E. | Had calms near St. Thomas; and in South lat. S.S. Westerly and Southerly winds. |
| | Sir Edward Hughes | 4 | 3 40 | 20 30 | May 10 | 1 0 N. | 22 0 W. | Variable. |
| | SirStep.Lushington | 16 | 6 0 | 21 30 | 23 | 4 0 | 20 30 | Southerly. |
| | Lord Hawkesbury | 19 | 7 30 | 18 0 | June 9 | 0 0 | 14 0 | Southerly. On May 30, was in 3° N. and 52° W. lon., stood Westward with Southerly winds. |
| 1801 | Princess Charlotte | 23 | 8 0 | 24 0 | May 31 | 1 40 | 24 30 | Variable. |
| 1802 | Earl St. Vincent | 10 | 7 0 | 22 0 | 21 | 3 0 | 20 30 | |
| | Anna | 10 | 7 0 | 21 30 | 18 | 3 30 | 20 20 | Variable and Calms. |
| | Cuffnel's | 28 | 8 30 | 22 0 | June 4 | 5 0 | 21 0 | |
| | Britannia | 30 | 9 0 | 22 0 | 12 | 4 0 | 17 30 | Southerly and variable. |
| | Tellicherry | 10 | 7 0 | 25 0 | May 14 | 3 0 | 27 0 | Variable. |
| | Herculean | 30 | 11 0 | 21 30 | June 10 | 2 30 | 24 0 | Variable and Southerly. |
| 1803 | Warren Hastings | 5 | 9 30 | 23 40 | May 21 | 2 0 | 25 0 | |
| | Earl Howe | 30 | 7 50 | 23 0 | June 6 | 3 40 | 19 30 | |
| | Lord Castlereagh | 25 | 9 0 | 22 0 | 5 | 3 30 | 22 0 | |
| | Ceylon | 29 | 9 30 | 21 0 | 8 | 4 0 | 19 0 | |
| | Preston | 29 | 7 0 | 23 0 | 5 | 3 30 | 20 0 | |
| | Warley | 29 | 7 38 | 21 0 | 7 | 3 40 | 16 0 | |
| | Alfred | 30 | 9 0 | 21 40 | 7 | 4 20 | 16 30 | |
| | Ganges | 31 | 8 0 | 22 30 | 6 | 3 50 | 19 0 | |
| | Coutts | 30 | 9 30 | 21 0 | 7 | 3 40 | 17 0 | |
| | Abergavenny | 28 | 8 0 | 22 0 | 6 | 2 0 | 20 0 | |
| | Union | 5 | 10 0 | 24 0 | May 21 | 2 0 | 23 0 | Southerly. |
| | Ocean | 30 | 6 30 | 23 0 | June 8 | 2 0 | 23 0 | Variable. |
| 1805 | Coutts | 23 | 7 0 | 22 30 | 1 | 2 0 | 20 0 | |
| 1791 | Bridgewater | June 16 | 16 0 | 19 30 | July 4 | 5 0 | 20 0 | Had N.N.W. winds to lat. 12½° N. then variable. |
| | Essex | 23 | 13 30 | 16 0 | 13 | 3 0 | 16 0 | Calms and Southerly winds. |
| | Bellmont | 26 | 10 30 | 23 30 | 3 | 3 0 | 20 30 | Variable. |
| 1794 | Woodford | 3 | 8 0 | 23 0 | June 11 | 5 0 | 20 0 | Variable mostly at Southward. |
| 1795 | Young William | 15 | 9 30 | 23 30 | 22 | 4 30 | 23 0 | |
| 1795 | Warren Hastings | 17 | 4 50 | 23 50 | 18 | 4 40 | 24 0 | Had no light winds. |
| 1798 | Tellicherry | 30 | 12 0 | 26 0 | July 10 | 3 0 | 24 0 | Variable and S. Westerly. |
| 1800 | Hugh Inglis | 1 | 10 0 | 25 0 | June 16 | 2 0 | 28 0 | Southerly. |
| | Rockingham | 29 | 10 0 | 25 9 | July 14 | 2 0 | 26 0 | |
| 1801 | Abergavenny | 22 | 13 0 | 22 30 | 12 | 2 0 | 17 0 | Northerly light winds to 8° N. afterward S. Westerly and S.S.W. winds. |
| 1802 | Fame | 13 | 11 0 | 25 30 | June 23 | 1 30 | 21 0 | Southerly and variable. |
| | Sir W. Bensley | 28 | 12 0 | 25 0 | July 15 | 2 0 | 20 0 | |
| 1803 | Woodford | 22 | 10 0 | 21 0 | 7 | 0 30 | 12 20 | Had light N. Westerly airs and calms, then S. Westerly winds. |
| 1804 | Asia | 15 | 8 30 | 23 0 | June 24 | 5 0 | 21 0 | Southerly and variable light airs. |
| | Bengal | 16 | 8 0 | 23 40 | 24 | 3 30 | 22 30 | Variable. |
| 1792 | Earl Talbot | July 9 | 13 0 | 24 0 | July 20 | 4 0 | 22 30 | Southerly. |
| 1794 | Sir E. Hughes | 23 | 10 0 | 22 0 | Aug. 2 | 4 0 | 20 0 | S.S. Westerly. |

| Year. | Outward-Bound Ships. | Lost N.E. Trade. Month. | Latitude. ° ′ | Longitude. ° ′ | S.E. Trade began. Month. | Latitude. ° ′ | Longitude. ° ′ | Remarks on Winds, &c. between the Trades. |
|---|---|---|---|---|---|---|---|---|
| 1795 | Cirencester.......... | July 31 | 14 0 N. | 26 0 W. | Aug. 15 | 3 30 N. | 22 0 W. | S.S. Westerly. |
| 1796 | True Briton......... | 17 | 17 0 | 25 30 | 16 | 2 0 S. | 8 0 | S. Westerly to S. by W. |
| 1797 | Queen................ | 5 | 8 30 | 22 30 | July 20 | 2 30 N. | 24 30 | Southerly. |
| 1798 | Osterly............... | 1 | 9 30 | 25 0 | 11 | 2 0 | 25 0 | |
| 1799 | Woodford............ | 12 | 9 0 | 23 0 | 20 | 2 40 | 15 0 | S. Westerly. |
| 1800 | Earl Spencer......... | 28 | 16 30 | 26 0 | Sept. 23 | 13 0 S. | 5 0 E. | S. Westerly light winds and calms. Crossed equator 2° E. Aug. 26. |
| 1801 | Minorca.............. | 18 | 15 0 | 26 0 | Aug. 8 | 3 0 N. | 24 0 W. | Variable and Southerly. |
| 1802 | Lord Eldon.......... | 11 | 11 30 | 23 0 | 24 | 9 0 S. | 1 0 E. | S.W. winds. Crossed equator in 4⅓° E. July 30. S.W. and S.S.W. winds continued. |
| | Minerva.............. | 7 | 13 0 | 19 30 | 15 | 9 30 | 5 0 | S.W. and S.S.W. winds. Crossed the equator, July 25, in 4° E. longitude. |
| | Travers............... | 9 | 13 0 | 25 0 | July 24 | 2 0 N. | 22 30 W. | S.S.W. and S.W. |
| 1803 | Essex ................ | 29 | 13 30 | 27 0 | Aug. 11 | 3 0 | 19 0 | S. Westerly. |
| | Princess Mary...... | 28 | 14 30 | 27 0 | 13 | 54 | 22 20 | S. and Westerly. |
| 1804 | Arniston............. | 14 | 12 0 | 26 0 | July 27 | 4 0 | 22 0 | |
| | Lord Eldon ......... | 31 | 8 0 | 21 0 | Aug. 8 | 4 30 | 22 0 | S. W. and Southerly. |
| 1793 | Earl Fitzwilliam.... | August 1 | 12 30 | 25 0 | 14 | 2 30 | 17 0 | |
| 1802 | Skelton Castle...... | 10 | 16 0 | 25 0 | Sept. 24 | 9 0 S. | 9 0 E. | S. Westerly on both sides of equator; crossed it Sept. 7, on meridian of Lond. |
| 1803 | Northampton........ | 9 | 11 30 | 25 0 | 1 | 2 30 N. | 25 0 W. | S. Westerly and Southerly. |
| | Ann .................. | 8 | 13 0 | 25 0 | Aug. 31 | 4 0 | 23 0 | |
| | General Stuart...... | 16 | 14 0 | 27 0 | Sept. 10 | 1 0 | 27 0 | |
| 1804 | Monarch............. | 7 | 13 0 | 25 0 | Aug. 24 | 1 0 | 13 0 | S. Westerly and variable. |
| 1794 | Dart.................. | Sept. 26 | 9 0 | 21 0 | Oct. 6 | 1 0 | 13 0 | |
| 1796 | Carnatic. ............ | 5 | 11 0 | 23 0 | 10 | 11 30 S. | 7 0 E. | S.W. and Southerly. Crossed equator 17th Sept. in 5° W. longitude. |
| 1796 | Queen................ | 5 | 11 0 | 23 0 | 9 | 8 0 N. | 3 0 | S. W. and Southerly. Crossed the equator in 3° E. and saw Anna Bona, 25th. |
| 1798 | Georgina ............ | 13 | 13 0 | 18 0 | 18 | 8 0 | 7 0 | S. Westerly, saw St. Thomas's Island, Oct. 1st, and next day the Coast of Africa. |
| 1799 | Swallow.............. | 29 | 12 0 | 19 0 | 12 | 3 30 | 23 30 W. | S. Westerly and variable. |
| 1801 | Elizabeth ............ | 9 | 15 0 | 27 0 | Sept. 24 | 2 0 | 19 0 | |
| 1803 | Georgina ............ | 28 | 10 30 | 23 30 | Oct. 12 | 1 30 | 23 0 | Variable. |
| 1797 | Henry Dundas..... | Oct. 20 | 14 0 | 25 0 | 30 | 5 0 | 26 0 | Southerly and variable. |
| 1800 | Georgina ........... | 16 | 8 0 | 23 0 | 20 | 4 0 | 24 30 | Variable. |
| | Prince Wm. Henry | 18 | 7 0 | 24 0 | 24 | 3 0 | 24 0 | |
| 1801 | Princess Mary...... | 9 | 12 0 | 26 0 | 30 | 1 0 S. | 19 0 | Southerly and faint airs. |
| 1804 | Ocean ............... | 18 | 8 0 | 22 0 | Nov. 4 | 3 0 N. | 18 0 | Calms and S.S. Westerly faint airs. |
| 1805 | Diana................ | 29 | 8 30 | 21 0 | 9 | 3 0 | 22 30 | Variable. |
| | Europe............... | 16 | 11 0 | 28 0 | Oct. 26 | 4 0 | 29 0 | Southerly and variable. |
| 1792 | Hindostan .......... | Nov. 10 | 10 30 | 22 30 | Nov. 15 | 5 0 | 22 30 | Variable. |
| | Swallow ............. | 27 | 6 0 | 21 0 | Dec. 1 | 4 30 | 21 0 | |
| 1796 | Bellona.............. | 13 | 5 0 | 27 0 | Nov. 13 | 5 0 | 27 0 | Wind fresh at E. veered gradually to S. Eastward. |
| 1798 | Cuffnells ............ | 5 | 9 30 | 25 0 | 19 | 4 0 | 23 30 | |
| | Sarah Christiana... | 15 | 8 40 | 25 40 | 26 | 4 40 | 25 0 | Southerly and variable. |
| 1803 | Lord Duncan....... | 10 | 9 0 | 23 0 | 15 | 4 0 | 22 0 | Easterly and variable. |
| 1803 & 4 | Britannia ......... | 25 | 13 0 | 20 0 | Feb. 1 | 7 0 S. | 1 0 | Calms and faint S.S.W. airs near the Coast of Africa, and in general. |
| 1793 | Lascelles ............ | March 10 | 1 40 S. | 19 0 | March 23 | 5 0 | 21 0 N. | Variable. |
| 1797 | Swallow ............. | 27 | 1 30 | 19 0 | April 7 | 3 30 | 22 0 | |
| 1803 | Cirencester.......... | 11 | 1 0 N. | 22 0 | March 16 | 2 0 | 25 0 | Northerly and variable. |
| | Lady Jane Dundas | 19 | 1 0 S. | 16 0 | April 1 | 5 30 | 21 0 | |
| | Tellicherry ......... | 18 | 1 10 | 21 0 | March 27 | 4 40 | 22 40 | |
| 1804 | Lord Duncan ...... | 8 | 1 40 N. | 23 0 | 8 | 1 50 | 23 0 | No light winds between the Trades. |
| | Huddart............. | 22 | 1 0 | 15 0 | April 6 | 8 0 | 19 0 | Light and variable. |
| | Waller Brig......... | 28 | 2 0 | 21 0 | March 30 | 3 0 | 21 0 | Light winds one day. |
| 1793 | Thetis ............... | April 22 | 1 0 | 23 0 | May 8 | 6 0 | 27 30 | Northerly. |
| 1800 | Sir Edward Hughes | 9 | 1 0 S. | 22 0 | April 15 | 4 0 | 25 30 | Variable. |
| 1802 | Lord Duncan....... | 28 | 1 0 N. | 20 0 | May 5 | 5 0 | 21 0 | |
| 1803 | Canton............... | 13 | 3 0 S. | 21 0 | April 20 | 4 0 | 25 0 | |
| 1803 | Lord St. Vincent... | 7 | 1 0 N. | 22 0 | April 14 | 4 20 | 26 0 | Variable. |
| 1804 | Earl Howe.......... | 12 | 2 30 | 20 0 | 16 | 6 0 | 20 0 | |

| Year. | Homeward-Bound Ships. | Lost N.E. Trade | | | S.E. Trade began. | | | Remarks on Winds, &c. between the Trades. |
|---|---|---|---|---|---|---|---|---|
| | | Month. | Latitude. ° ′ | Longitude. ° ′ | Month. | Latitude. ° ′ | Longitude. ° ′ | |
| | Charlton ........... | April 12 | 1 20 N. | 19 30 W. | April 17 | 6 0 N. | 24 0 W. | |
| 1793 | Melville Castle ... | May 4 | 30 | 22 0 | May 11 | 7 0 | 22 30 | |
| 1798 | Rose... .. ......... | 13 | 4 0 | 23 30 | 16 | 7 0 | 25 0 | Southerly. |
| | Marquis Lansdown | 14 | 4 30 | 22 30 | 16 | 7 0 | 24 0 | |
| | Admiral Gardner | 24 | 2 30 | 22 0 | 31 | 7 0 | 25 0 | Southerly and variable. |
| 1800 | Taunton Castle ... | 4 | 2 30 | 23 30 | 9 | 4 0 | 25 0 | |
| | Manship ........... | 16 | 1 0 | 20 0 | 22 | 6 0 | 20 0 | |
| 1801 | Lord Nelson ...... | 5 | 3 30 | 24 0 | 6 | 4 30 | 25 0 | |
| 1802 | Royal Admiral...... | 23 | 5 0 | 26 0 | 23 | 5 0 | 26 0 | No light winds. |
| 1792 | Kent ............... | June 2 | 1 0 | 22 0 | June 9 | 8 30 | 24 30 | Southerly and variable. |
| 1794 | Northumberland ... | 2 | 2 0 | 21 0 | 17 | 12 0 | 21 0 | Variable and calms. |
| 1796 | Carron ............... | 11 | 30 | 17 50 | 19 | 9 0 | 17 40 | |
| 1798 | Sir Edward H uges | 12 | 1 30 | 19 30 | 24 | 12 0 | 25 0 | |
| 1799 | Bridgewater ....... | 11 | 2 30 | 24 0 | 18 | 8 40 | 25 0 | |
| 1800 | Woodford .......... | 7 | 1 30 | 23 0 | 17 | 8 30 | 26 0 | |
| | Earl Howe ......... | 29 | 5 30 | 21 0 | July 16 | 15 0 | 26 0 | Variable. |
| 1803 | Marquis Wellesley | 1 | 3 40 | 22 0 | June 7 | 8 0 | 22 30 | |
| | Lord Nelson ....... | 29 | 6 40 S. | 15 0 | July 16 | 11 0 | 27 0 | Easterly to 1° N. 23° W. July 6th. |
| | Cuffnells ............ | 2 | 2 0 N. | 23 0 | June 7 | 7 0 | 23 0 | Southerly. |
| | Fame ............... | 22 | 5 0 | 23 0 | July 2 | 12 0 | 26 0 | Southerly and variable. |
| | Sir W. Bensley ... | 10 | 5 0 | 24 0 | June 15 | 9 0 | 25 0 | |
| | Dover Castle ...... | 5 | 4 30 | 22 0 | 14 | 10 0 | 22 0 | |
| 1806 | Walpole ........... | 4 | 4 0 | 21 0 | 9 | 7 30 | 21 0 | |
| 1793 | Belmont ........... | July 5 | 5 0 | 22 0 | July 15 | 11 30 | 24 0 | |
| 1794 | Exeter ............... | 14 | 4 0 | 25 0 | 30 | 14 30 | 28 0 | Variable and Northerly. |
| 1795 | Lord Hawkesbury... | 13 | 0 | 21 0 | Aug. 1 | 11 40 | 27 0 | |
| 1799 | Tellicherry ......... | 18 | 4 0 | 17 0 | July 29 | 13 0 | 27 0 | |
| | Sarah Christiana... | 28 | 4 0 | 23 0 | Aug. 6 | 14 40 | 25 30 | S.W. and Westerly. |
| 1802 | Earl Mornington... | 9 | 1 30 | 20 0 | July 16 | 13 30 | 26 0 | S.W. and Westerly. |
| 1804 | Abergavenny ...... | 2 | 6 0 | 21 0 | 8 | 12 0 | 24 0 | S.W. and variable. |
| | Sir Wm. Pulteny... | 22 | 10 0 | 23 0 | 26 | 12 0 | 26 0 | Variable. |
| 1805 | Arniston ............ | 25 | 4 40 | 22 0 | Aug. 7 | 14 0 | 26 0 | S.W. and variable. |
| 1793 | Earl Talbot ......... | Aug. 14 | 3 0 | 22 0 | 22 | 14 0 | 26 0 | |
| 1798 | Queen ............... | 22 | 3 0 | 25 0 | Sept. 1 | 17 0 | 27 0 | S.W. brisk winds. |
| 1802 | Abergavenny ...... | 2 | 5 0 | 24 0 | Aug. 9 | 13 0 | 28 0 | S.W. and variable. |
| 1803 | Travers ............ | 12 | 5 0 | 26 0 | 18 | 13 0 | 28 0 | |
| 1804 | General Stuart ... | 26 | 5 0 | 21 0 | Sept. 6 | 16 0 | 27 0 | |
| 1795 | Duke of Buccleugh | Sept. 17 | 2 30 | 24 30 | 24 | 11 30 | 26 0 | |
| 1797 | Malabar ............ | 4 | 4 0 | 21 0 | 18 | 13 30 | 28 0 | Variable. |
| 1801 | Anna ............... | 15 | 4 0 | 22 40 | 29 | 13 30 | 27 30 | |
| 1802 | Princess Charlotte | 18 | 3 30 | 19 40 | 24 | 11 0 | 23 0 | South Westerly. |
| 1804 | Preston ............ | 23 | 3 0 | 24 0 | Oct. 1 | 12 0 | 25 0 | Variable light winds. |
| 1796 | Cirencester ......... | Oct. 5 | 4 30 | 25 0 | 12 | 8 30 | 26 0 | |
| 1801 | Hugh Inglis ....... | 20 | 2 30 S. | 17 0 | Nov. 2 | 10 0 | 25 0 | |
| 1802 | Princess Mary...... | 7 | 3 0 N. | 22 0 | Oct. 20 | 16 0 | 28 0 | |
| 1803 | Minerva ............ | 6 | 2 0 | 22 0 | 14 | 10 30 | 22 30 | |
| 1803 | Experiment......... | Nov. 30 | 3 0 | 21 34 | Dec. 7 | 7 0 | 21 40 | |
| 1804 | Princess Mary...... | 20 | 3 40 | 23 0 | Nov. 23 | 7 0 | 23 30 | |
| 1793 & 4 | } Swallow ......... | Dec. 28 | 1 0 | 18 0 | Jan. 5 | 6 0 | 19 0 | |
| 1795 | Nancy ............... | 25 | 3 0 | 19 30 | Dec. 29 | 6 0 | 21 0 | |
| 1796 | Earl Fitzwilliam ... | 23 | 1 0 | 21 0 | 27 | 4 0 | 22 30 | |
| 1797 | Carnatic .......... | 25 | 2 0 | 22 30 | 26 | 3 0 | 22 0 | Southerly. |
| 1798 | Hawke............... | 19 | 2 30 | 21 30 | 23 | 5 0 | 23 0 | Variable. |
| 1801 | Travers ............. | 5 | 4 0 | 26 0 | 6 | 5 0 | 26 30 | |
| 1804 | Ann ................. | 20 | 1 0 | 23 0 | 27 | 5 0 | 25 0 | Calms and faint breezes. |
| 1805 | Northampton ...... | 14 | 2 30 | 20 0 | 20 | 6 0 | 21 0 | Variable and light winds. |

## ABSTRACT OF THE FOREGOING TABLE,

*Exhibiting the Equatorial Limits of the Trades, between 18° and 26° West Longitude, exclusive of the few Ships which made the Eastern Passage to St. Helena.*

| Months. | Lost N.E. Trade Homeward, in | | | N.E. Trade began Homeward, in | | | Mean out and Home. | Lost S.E. Trade, Homeward, in | | | S.E. Trade began Outward, in | | | Mean out and Home. | Diff. of the Mean Limit of N.E. & S.E. Trades. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Latitude. | | Mean. | Latitude. | | Mean. | | Latitude. | | Mean. | Latitude. | | Mean. | | |
| | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° | ° |
| Jan. | 5 | to 10N. | 7 N. | 3 | to 6 N. | 4½ N. | 5¾ N. | ½— | to 4 N. | 2¼ N. | 2 | to 4 N. | 3 N. | 2¾ | 3 |
| Feb. | 5 | 10 | 7 | 2 | 7 | 5 | 6 | 2 S. | to 3 | 1½ | ½ | 1 | 1 | 1¼ | 4¾ |
| March | 2½ | 8 | 5½ | 2 | 7 | 5 | 5⅛ | 1 | 2 | 1 | ½ | 2½ | 1½ | 1¼ | 3¾ |
| April | 4 | 9 | 6 | 4 | 8 | 5½ | 5¾ | 2 | 2½ | 1 | 0 | 2½ | 1½ | 1¼ | 4½ |
| May | 5 | 10 | 7 | 4½ | 7 | 6 | 6½ | 1 N. | to 4 | 2½ | 0 | 4 | 3 | 2¾ | 3¾ |
| June | 7 | 13 | 9 | 7 | 12 | 9 | 9 | 1 | 5 | 3 | 0 | 5 | 3 | 3 | 6 |
| July | 8½ | 15 | 12 | 11 | 14 | 12 | 12 | 1 | 6 | 4 | 1 | 5 | 3 | 3½ | 8½ |
| August | 11 | 15 | 13 | 11 | 14½ | 13 | 13 | 3 | 5 | 4 | 1 | 4 | 2½ | 3¼ | 9¾ |
| Sept. | 9 | 14 | 11½ | 11 | 14 | 12 | 11¾ | 2 | 4 | 3½ | 1 | 3 | 2 | 3 | 8¾ |
| Oct. | 7½ | 13 | 10 | 8½ | 14 | 10 | 10 | 2 | 5 | 3 | 1 | 5 | 3 | 3 | 7 |
| Nov. | 6 | 11 | 9 | 7 | 0 | 7 | 8 | 3 | 4 | 3½ | 3 | 5 | 4 | 3¾ | 4¼ |
| Dec. | 5 | 7 | 6 | 3 | 6 | 5 | 5½ | 1 | 4 | 2½ | 1 | 4½ | 4 | 3¼ | 2¼ |

The numbers in this last column shew the space of variable winds, &c. between the mean limits of the Trades. The columns of means do not always exhibit the exact mean of the *two* extremes for each month, but these mean numbers *incline* a *little* from the true mean, towards the extreme limit experienced by the majority of the ships.

The observations are rather few in number for some months, to obtain a correct mean; but the first column shewing the extreme limits for each, will be most useful to refer to, as it marks the situations where the trades may reasonably be expected to fail or commence.

Limits of N.E. trade.

An interesting description of winds, printed in 1675, by John Seller, Hydrographer to the King, reprinted by Mr. Dalrymple, in 1807, agrees nearly with the above abstract, in fixing the southern limit of the N.E. trade, as experienced in the different months of the year. The remarks relative to the southern limit of the N.E. trade, in the treatise mentioned, seem judicious and concise, and are as follows:

"In January, February, and March, the north-east trade-wind bloweth commonly unto 4° N. lat., where at that time beginneth the south-east and easterly trade-wind.

"In April, the north-east trade-wind bloweth commonly unto 5° N. lat., where then beginneth the south-east wind.

"In May, the north-east trade-wind bloweth unto 6° N. lat., where at that time beginneth the south-east wind, somewhat more southerly.

"In June, the north-east trade-wind bloweth unto 8° N. lat., where then beginneth the southerly wind.

"In July, the north-east trade-wind bloweth unto 10° N. lat., where then beginneth the southerly wind somewhat westerly.

"In August, the north-east trade-wind bloweth unto 11° N. lat., where the southerly wind begins somewhat westerly.

"In September, the north-east trade-wind bloweth unto 10° N. lat., where the southerly wind beginneth.

"In October, the north-east trade-wind bloweth unto 8° N. lat., where then the southerly wind beginneth somewhat easterly.

"In November, the north-east trade-wind bloweth unto 6° N. lat., where the south-east wind beginneth.

"In December, the north-east trade-wind bloweth unto 5° N. lat., where the south-east wind beginneth.

Variable winds between the trades.

"It is to be observed, that between the north-east and the south-east trade-wind, the winds are subject to alteration, which variableness is sometimes found a degree or two sooner or later than the aforesaid latitude; and the more northerly you are, the more is the variableness found to be about the north and the north-east; and the more southerly you are, the more are the winds found to blow about the south-east and the south."

This observation is partly correct, but it is generally experienced that the southerly winds prevail more than any other throughout the whole space of variable winds between the trades, more particularly when the sun has great North declination; then the homeward-bound ships are enabled to cross this space more quickly than the ships outward-bound, which they do generally, at all seasons. Calms and variable winds, are also experienced during every month of the year, in the space between the trades; the former seldom continue long, and the vicinity of the N.E. trade seems most liable to them. Sudden squalls often follow these calms, which ought to be observed with great care, and sail quickly reduced when they are perceived to approach; for many of the East India ships lose their topmasts and sustain other damage by these equatorial squalls, which give very little warning.*

Storms near the equator.

These squalls are sometimes accompanied by whirlwinds, in their first effort against the resisting atmosphere, and may blow strong for an hour or two; but a gale of wind or storm of much duration, *probably* never happens far from land near the equator in the open ocean, or any part of the globe; although in its vicinity, sudden gusts of wind and whirlwinds are experienced at times.

S.W. and W.S.W. winds with much rain, often prevail in July, August, and sometimes in June and September, blowing towards the coast of Guinea, and sometimes as far north as the Cape de Verde Islands; which winds are called the *Line Westerly Monsoon*, by the navigators who trade to the Gulf of Guinea.

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# FROM THE CAPE DE VERDE ISLANDS ACROSS THE EQUATOR.

## CROSSING THE EQUATOR—ISLANDS AND DANGERS IN THE SOUTH ATLANTIC.

### CROSSING THE EQUATOR.

Trade wind near Cape de Verde.

MANY journals seem to prove, that the N.E. trade-wind is deflected by the projection of Cape de Verde to the westward, and that ships which keep near the coast of Africa lose the trade sooner than others which are at a greater distance from the coast. To guard against this, it is recommended by some commanders, to keep well

* The atmosphere is also charged at times with electric matter, from which ships are liable to receive damage. The Company's ship Reliance, at $8\frac{1}{2}$ A.M., March 21st, 1828, during a torrent of rain from a heavy cloud which burst over her with a tremendous peal of thunder, had her foretopmast struck by lightning, in lat. 1° 45′ N. lon. 22° 20′ W., which rent the topmast in pieces, set the gallies on fire, passed down into the gun and orlop decks, filling them with sulphureous smoke, and created a temporary horror and alarm, as there were seven soldiers and about twenty seamen who were more or less scorched or struck by the lightning, and two seamen were swept overboard with the mast and perished. It did not appear that any part of the iron-work about the masts contributed to produce this calamity. The Marquis of Camden, in lat. 4° 30′ N., lon. 22° 18′ W., at $3\frac{1}{2}$ A.M., March 23rd, 1828, was struck by lightning, which broke the maintop-gallant-mast and topmast, killed a sergeant and a private soldier, and hurt five seamen.

to the westward at the time the N. E. trade fails, with a view to retain it longer, to have fewer calms and baffling winds in the variable space, and to meet the S. E. trade-wind sooner than if more eastward. By adhering to this precept, several ships have crossed the equator far West, then meeting with the S. E trade hanging far from the southward, with strong westerly currents, have made the Brazil coast about Cape Roque, or farther to the westward, which greatly prolonged their voyage. Crossing the Equator.

In the summer months, when the sun is in the northern hemisphere, outward bound ships should not run too far to the westward; for in this season, it has sometimes happened, that the N.E. winds have continued longer with ships in lon. 19° to 23° W., than with others which had separated from them, and lost the trade in 26° and 27° West longitude.

On whatever side the Cape de Verde Islands are passed, the most eligible position at losing the N.E. trade is *probably* from lon. 18° to 23° W.

When the sun is near the northern tropic, the trade often fails ships near, or in sight of these islands; it is certainly best to pass to the westward of them at such times, at 8 or 10 leagues distance at least, to preserve the steady wind and prevent delay, as light eddy winds prevail near and amongst them in this season. When to the southward of the Cape de Verde Islands, steer to the south-eastward, if the wind permit, and endeavour to get into lon. 18° to 23° W. at losing the N. E. trade. If then, the southerly winds commence, take advantage of the shifts to stand on the tack which gains most southing, and endeavour to cross the equator from 18° to 23° W., if the winds admit; but do not be induced to make a long tack either eastward or westward, with a dead southerly wind, in hopes of meeting a better, unless it veer so far, as to gain much southing.

The S. E. trade, generally at its northern limit, inclines far to the southward, particularly in July, August, and September; and the same has been known in other months. When a ship meets this trade, she should not be kept too close to the wind, or she will make little progress, but ought to be kept clean full, to enable her to make good way through the water to the south-westward, by which means she will soon get to the southward of the limits of the westerly* current prevailing about the equator, and to lat. 4° or 5° N.: it also extends to lat. 3° or 4° S. about Fernando Noronha; and from lon. about 27° W. to Cape Roque, it runs very strong, particularly from September to March. Current near the Equator.

In proceeding to the southward, the wind will draw more to the S. E. and finally to East and E.N.E. at the southern limit of the trade.

## ISLANDS AND DANGERS.

WARLEY BANK, is described by Capt. Collins, of that ship, to be a small coral bank (which she passed over, at 7 A.M. May 7th, 1813) about 100 feet long and 50 feet broad, which was distinctly seen; its edges were clearly delineated, and upon it several ridges of rock appeared, with sand between them. The ship passed too quickly over it to admit of time to sound, it being accidentally seen by Capt. Collins, when looking over the quarter. He thought there might be 7 fathoms water over the shoalest part; and a quarter-master, who also saw it, thinks the least water on this shoal might probably be 10 or 12 fathoms. Warley Bank.

* In winter, the currents from the Cape de Verde Islands sometimes set easterly and sometimes westerly to 4° or 5° N. lat., at other times they are variable; but to the southward of lat. 3° or 4° N., and westward of lon. 20° or 22° W., the equatorial current perpetually runs to the westward.

The fleet at this time consisted of eight ships, including H.M.S. Salsette, their convoy; and by mean of all the observations and chronometers of those eight ships, this *very doubtful* rocky bank is situated in lat. 5° 4′ N., lon. 21° 26′ W.

It might have been a shoal of Devil-fish the Warley passed over; they are gregarious, and of large size near the equator, and as they swim several fathoms below the surface, their variegated backs appear sometimes exactly like coral rocks.

St. Paul Rocks.

ST. PAUL ROCKS, called also Penèdo de San Pedro, in lat. 0° 55′ N., lon. 29° 15′ W., by mean of many ships' chronometers and lunar observations. Captain Foster, in H. M. S. Chanticleer, in 1828, made it in long. 29° 17′ by mean of seventeen chronometers. Captain Fitz Roy, who visited these rocks in Feb. 1832, places the summit of them in lon. 29° 22′ 45″ W. He says "from the highest point of the rock no discoloured water nor any breaking of the sea could be discerned apart from the place itself; and from the soundings taken in the boats as well as on board the ship, I conclude that it is unconnected with any shoal, being merely the summit of a steep sided mountain, rising from the bottom of the ocean. There was a slight current setting to the westward not amounting to a mile an hour." This rocky isle has been seen by several ships both outward and homeward-bound, although it is considerably to the westward of the *common* route of the latter; and no ship bound to the southward should cross the equator so far West.

The Tellicherry passed within five miles of it, May 17th, 1802, bound for India. A view was taken, when it bore from N. 30° W., to N. 37° W., distant five or six miles; by this view, St. Paul seems to be a heap of rugged rocks, having low gaps between some of them; the northernmost is a small pyramidal rock, not so high as the others. The description annexed to the view in the journal, says, "This island is all rocks, about the height of a ship's mast out of the water."*

Mons. de Landeneuf, in the ship Le Curieux, was sent to explore this island in 1768. His account and the Tellicherry's are similar: he found it consisted only of a heap of steep rocks, covered with birds' dung, without verdure, having no place fit for anchoring, nor convenient for landing.

Variation.

The variation at St. Paul by Capt. Fitz Roy in 1832, was 9° 30′ W.

Fernando Noronha.

FERNANDO NORONHA, which consists of one large and several small islands, has not unfrequently been visited or seen by ships bound to India, the currents having horsed them to the westward, after the failure of the N. E. trade. Fernando Noronha is peopled with exiles from the coast of Brazil, and is well defended by forts, built on the places most eligible for its security. It is hilly uneven land, and may be seen 10 leagues in clear weather. The principal island has on it a high rocky peak, called the Pyramid, which is very remarkable, and seems to lean or overhang to the eastward, when it bears S. S. W. The S. W. point is perforated, and has off it a sunken rock at a considerable distance, dangerous to approach. From the S. E. part of the island a reef extends to seaward, and some sunken rocks† at nearly a league distance from the shore. There is also said to be a reef on which the sea always breaks, about three miles from the East part of the island, with a channel of 10 to 15 fathoms within it, and that the Pyramid is shut in with the highest hill when upon the rocks.

Dangers.

* It is elevated about 35 feet above the sea, and consists of a group of several rocks adjoining each other, with soundings of 30 to 80 fathoms near them, as found by a commander of the navy, who landed on it in 1813.

† Mr. Driver describes these as two rocks above water, distant about 3½ miles off the S.E. part of the island.

The group extends nearly 7 miles about S.W. and N.E., and is less than two miles broad; the shores are rocky and the surf frequently high; at such times there is no safe landing. It is not advisable to touch at this island, except in cases of necessity; for water is a scarce article in the dry season, and when procurable, cannot always be got off from the shore on account of the surf. The well which supplies ships with water is near the governor's house, but landing the casks and getting off the water is inconvenient. There is little rain; sometimes two years have passed without any, the rivulets being dried up, and vegetation quite parched; at such times a ship would obtain little benefit by stopping here. Wood is cut on a little island near the North point of the large one, but is not conveniently got into the boats on account of the rocky shore. Extent, supplies, &c.

The General Stuart anchored at Fernando Noronha, September 15th, 1803 (outward-bound), in 18 fathoms water, the N.E. end of Wood Isle E.N.E., the S.W. end of Fernando Noronha S.W. by W., the Peak S. by W., Water Bay S. ½ E., off shore about 2 miles. She remained here four days, and could procure only nine casks of water, the well being nearly dry.

November 20th, 1805, the Ann, outward-bound, anchored in 17 fathoms shells and rocky bottom, extremity of Fernando Noronha from E.N.E. to S.W. by W., the Peak S. by W., the Church and Round Castle S. by E., the large Fort E.S.E., off shore 2 or 2½ miles.

November 22d, 1805, the Tigris anchored in a ¼ less 9 fathoms, sand and rocky bottom, Cloven Rock, N.E. ¼ N., Fort Island N.E. by E. ¾ E., Fort Remedios S.S.E. ¼ E., Pyramid S.W. ½ S., western extreme S.W. by W. ½ W., off shore about a mile. These ships sailed in company 24th; the Tigris received three bullocks, the Ann received some stock and twelve butts of water, but they found great difficulty in getting the water from the shore, the surf being very high.

The currents run very strong to the westward about Fernando Noronha, therefore, ships intending to anchor here, should always pass round the North end of the island, which is formed by a chain of several small islets, very near each other, having forts on some of them that command the anchorage. Currents.

There is good anchorage in 13 fathoms, fine white sand, off shore about 1 mile, with Fort St. Antonio E. by S. ½ S., Fort Remedios S. by W., Fort Concepçaõ S.S.W. ½ W., Pyramid S. 42° W. The road of Fernando Noronha is unsafe to lie in with northerly or north-westerly winds, which are said to prevail from December to April; at other times, they are mostly S.E. or easterly, and sometimes N.E. Anchorage.

The tide rises about 6 feet, and flows at 4 hours on full and change of the Moon. There is very little variation of the compass here at the present time.* Tide.

The Pyramid is in lat. 3° 55¼′ S., and in lon. 32° 16′ W., by General Brisbane and Mr. Rumker, in 1821, measured from Funchal by good chronometers, and also by measurement to Rio Janeiro. Capt. Beechey, R.N., on his voyage to the Pacific, in 1825, made it in lon. 32° 15′ 9″ W., by chronometers, and in 32° 14′ 43″ W. corrected for the errors of chronometers after arriving at Rio Janeiro. By mean of 100 lunar observations he made it in lon. 32° 18′ 46″ W. Capt. Foster, in H.M.S. Chanticleer, in 1828, made the Governor's house in lat. 3° 50′ S., lon. 32° 21′ W. Captain Fitz Roy in 1832, places Fort Concepçaõ in 32° 25′ W. Position.

ROCCAS, is a very dangerous low isle or reef, a little above water. Ships which Roccas.

* Capt. Fitz Roy in 1832 found the variation 7° W.

pass between Fernando Noronha, and the Brazil coast, should be cautious in the night, if not certain of their position; for the strong westerly currents are liable to sweep them to leeward.

The Earl Elgin saw it in July, 1761, having first seen Fernando Noronha on the 13th, and on the 19th she had soundings on the bank off Cape Roque; at noon 23d, the Roccas bore E. $\frac{1}{2}$ N. to E. $\frac{1}{4}$ S., distant 4 miles, observed lat. 3° 50′ S. This ship's lon. by account, placed the Roccas 2° 12′ E. from Fernando Noronha, whereas it is about 50 miles West of the Island; she had therefore, experienced a westerly set of 3° 2′ in ten days. In the Earl Elgin, they call it a low island, or more properly, a shoal, that cannot be seen at 3 leagues distance; a sand bank, surrounded by rocks, with high breakers mostly all round, and a projecting point of breakers at the North and South ends of the shoal.

Portuguese account.

By the Portuguese, the Roccas is said to bear West, a little northerly, distance 15 leagues from Fernando Noronha.

Accounts from English ships' journals.

The Company's ship Britannia, and King George transport, were wrecked on this reef at 4 A.M. 2d November, 1805. Captain Birch, who commanded the Britannia, says, "the Roccas are only distant from Fernando Noronha 45 miles; their latitude the same as that island; the rocks most dangerous are to the northward and north-eastward; the whole extent may be about 5 miles; the current set $2\frac{1}{2}$ miles per hour to the westward; rise and fall of tide 6 feet."

In the fleet, several ships narrowly escaped the fate of the Britannia and King George, having separated several days before. The Leda frigate, with one division, led past the shoal, and just cleared it, when the Britannia and King George were wrecked. Several ships of the other division, under Sir Home Popham, saw the shoal on the following morning.

The Northampton's journal describes it as a dangerous shoal, very little above water, with breakers all round, except on the S.W. or lee-side, where appeared a white sandy beach, on which a boat might land. The Glory's journal describes it as two low sand banks, when it bore S.S.E. 2 or 3 miles; and when on the West side of it, at 2 miles distance, she had ground 28 fathoms, coral rock.

Position.

By mean of the observations and chronometers of ten different ships, taken about thirty years ago, the Roccas shoal seems to be in lat. 3° $52\frac{1}{2}$′ S., lon. 33° 31′ W.; but allowing the longitude of Fernando Noronha stated above to be correct, and that the difference of their meridians is 50 miles, then the Roccas will be in about lon. 33° 6′ or 33° 7′ W., which is probably near the truth.

Martin Vas Rocks.

MARTIN VAS ROCKS, are high and barren, the central one is largest, and may be seen from a large ship's poop at 11 leagues distance; this is a little more easterly than the other two, although they are nearly on the same meridian, as they are all in one when bearing South. The northernmost and central rocks are near each other, but between the latter and the southernmost there is a channel, through which the Chesterfield passed in March 1800, and observed the lat. 20° 28′ S. when in mid-channel. When through, she hove to, in 12 fathoms, with the largest rock bearing E.N.E. about 1 mile distant, the bottom then visible, and caught plenty of rock-cod and other fish: the boat in sounding, found the depth decrease gradually over a rocky bottom, to $1\frac{1}{2}$ fathom close to the largest rock. Capt. Mallors, of the ship Rose, southern sealer, belonging to Messrs. Enderby, states that in July 1833, he discovered a sunken rock, bearing N.E. from the largest Martin Vas, about $2\frac{1}{2}$ miles, to which a boat was sent, and found the swell formed a breaker when passing over it.

The north rock is small, and it is the most westerly of them; they are all steep and inaccessible, and the distance between the two extremes is about 3 miles.

The breadth of the channel between these rocks and the Island of Trinidad is about $8\frac{1}{2}$ leagues.

By mean of the observations and chronometers of 12 different ships, the central Martin Vas Rock is in lat. 20° 28′ 30″ S., lon. 28° 42′ W.; but Capt. Owen in his survey makes the largest rock in lat. 20° $29\frac{1}{2}$′ S., lon. 28° $54\frac{1}{4}$′ W. Lieut. Raper adopts 28° 51′ W. Position.

TRINIDAD is about six miles in circumference, extending nearly S.E. and N.W.; it is high and uneven, and just discernible from a large ship's poop in clear weather at 18 leagues distance. It is rocky, and in general barren, but in some parts there are trees about 12 or 18 inches diameter on the heights, particularly about the South part of the island. The shore is rocky and difficult of access, occasioned by the high surf continually breaking on it in every part. On the West side, almost detached from the island, there is a rock about 850 feet high, with trees on it, called the Monument, or Nine Pin, which is of cylindrical form. There is also a bluff rock, about 800 feet high, through which there is a stupendous arched passage, 40 feet in breadth, nearly 50 in height, and 420 in length; the sea breaks through the arch with great noise, and there are more than 3 fathoms water under it, and in the basin formed at its East side. At the S.E. end of the island there is a rock of a conical form, about 1,160 feet high, called the Sugar Loaf, with trees likewise on its summit, and whenever it rains hard, a beautiful waterfall of above 700 feet is projected from it. Trinidad.

At the East and S.W. sides of the island, good water runs down in two small streams; it may also be procured at times from the rock that forms the S.W. extreme; but, excepting when rain prevails, these *runs* are very small, and it seems probable, that they may in some seasons be dried up. Ships should not stop at this island for water, unless greatly in want, for much difficulty is found in getting it from the shore; the anchorage is also unsafe, as the winds are often variable, and if a gale happen from West or south-westward, they would be in danger of driving on the shore. This insecurity of the anchorage deters ships from visiting the island, although they often see it in passing to the southward through the S.E. trade. Although Trinidad is within the southern tropic, the S.E. trade-wind is not regular there; N.E. and northerly winds often happen, particularly the former, and sometimes hard squalls, or S.W. gales have been experienced, which render the anchorage at this island hazardous. Water. Anchorage.

Ships touching at Trinidad, to endeavour to procure water, should anchor in 30 fathoms, about a mile from the West part of the island, that they may be able to clear it on either tack, should the wind blow from the westward; for the Rattlesnake was wrecked in a westerly gale, and the Jupiter and Mercury narrowly escaped destruction.

The Georgina packet anchored in October 1799 at the N.W. end of Trinidad, in 19 fathoms, fine black sand, and moored off shore about 3 cables' lengths; the extremes of the island East and South; a large rock detached from it about a $\frac{1}{4}$ mile bore S.S.W. $\frac{3}{4}$ W. about $\frac{3}{4}$ mile; found 10, 11, and 12 fathoms coral, between the rock and the shore. The surf being great, they landed at one place with difficulty, and shot some wild hogs; good water was found about $\frac{1}{2}$ a mile inland, but it seemed almost impossible to get it from the shore on account of the surf, and it must have been carried about $\frac{1}{2}$ a mile in small kegs, had they been in immediate want.

Captain Charles Lesley, of the Orford man-of-war, in his journal of 1773-4, mentions three bays at the South and S.W. sides of Trinidad. He recommends the easternmost as the best, the western or middle bay being rocky, and the northernmost having shoal water. The easternmost bay seems to be situated at the S.E. part of the island. Captain Lesley says, a church with a cross on it stands at the upper part of the bay, and that a ship may anchor in six fathoms, the church bearing W.S.W., and a point like the South Foreland S.W. by W., and may moor with one cable on shore.

The watering place he describes to be near the church, and that a long boat may fill the water there with a spout or hose.

Notwithstanding this description of the bay at the South part of the island, it would certainly be imprudent for any ship to anchor there with the S.E. trade-wind, and it probably ought never to be done unless the weather is very settled, and the wind fixed to the northward: at all events, no navigator would approach so near as to moor with a cable on shore, except this were a safe harbour, which it certainly is not. Perhaps there is at present no vestige of a church at this place.

The Chesterfield passed the North end of the island very close, in March 1800, and her boat went all round it; the shore appeared to be steep and bold to approach. She anchored in 25 fathoms, with the Nine Pin bearing N.N.E. 1 mile; they could only land at one part about a mile from the watering place, on account of the surf, and although good water ran down within 50 fathoms of the shore, they could only get it to the long boat moored outside the surf by filling canvas bags, holding about 10 gallons each, and hauling them off by a circular rope of communication rove through a block in the boat. H. M. S. Bristol once anchored here, and filled about 30 tons of water in one day, with a long hose, when there happened to be little surf. The Chesterfield got about 30 young hogs, which were very good; there are many wild goats on the island, but they are shy, and cannot be caught.

Position.

By mean of the observations and chronometers of ten different ships, the centre of the Island of Trinidad is in lat. 20° 29′ 30″ S., and in lon. 29° 10′ W. Capt. P. Heywood and Capt. Corry, of the Royal Navy, made it in lon. 29° 14¾′ W. by mean of chronometric admeasurements from Madeira, St. Helena, and Rio Janeiro, corresponding within one and two miles of each other; some observers make it a little more westerly. Capt. Flinders made the S.E. point in lon. 29° 19′ W., by lunar observation, and 29° 23′ W. by chronometers. Capt. Owen made the same point in lat. 20° 31′ S., lon. 29° 22′ W., in 1822, and he made the variation 5° West in 1821. Capt. Shepherd, of the Company's ship Hythe, made the body of the island in lon. 29° 16′ W. by mean of several observations in different voyages. Lieut. Raper adopts 29° 19′ W. for the South Point.

From the equator towards Ascension.

Some outward-bound East-India ships, after crossing the equator, have found the S.E. trade far to the eastward, which enabled them to pass in sight of the Island of Ascension: this can only happen to ships which cross the equator far eastward of the common track, when the sun is near the southern tropic. The trade-wind may then veer to E. by S. or East; and at such times, a South course may probably be made, by keeping close to the wind in crossing the trade; although ships bound to India, or the Cape of Good Hope, should not adopt this route with a view of shortening the distance; for their principal object is to get quickly through it, into the northerly and westerly winds, where they will soon run down the longitude.

Although Ascension is seldom seen by ships bound to India, it is directly in the route of those homeward bound, for they generally see it in passing; particularly in times of peace, when no danger is apprehended from cruizers.

ASCENSION ISLAND, about 2½ leagues in length from East to West and 2 leagues broad from North to South, may be seen 15 leagues or more, in clear weather, there being several peaked hills on it; the highest, called Green Mountain, is situated near the S.E. part of the island, and is about 2,800 feet high,* and appears a double peak in some views. Most of the hills are covered with red earth, like brick dust, being a decomposition of the volcanic rock, which forms the island. It has a most dreary aspect, the surface consisting of calcined rocks and pumice stone, dangerous and difficult in some places to walk over, as they have little solidity, and are often sharp-pointed and rough. There was formerly no verdure except purslane, which grew mostly about the Green Mountain, and was found in April, May, June, and July. Dampier (whose ship was lost on this island) is said to have discovered a spring of fresh water on the S.E. side of the High Mountain, about ½ a mile from its summit. At that time (1700-1), he found plenty of goats and land crabs near the spring of water. Since the time that Bonaparte was sent to St. Helena, a British naval force has been placed at Ascension, and the men composing it have found means to form some garden grounds, wherein they cultivate vegetables of various kinds for the use of the table. It has been found a healthy island, and a valuable depôt for provisions, which this dry atmosphere preserves; whereas, on the coast of Guinea all kinds of provisions soon become corrupted. Some small springs have lately been found, and the water is now conducted from them in iron pipes to the garrison; and at times some can be procured for the supply of shipping. The wild goats are lean; rats and mice abound, and there are a few insects. The summit of the mountain is frequently enveloped in clouds or vapour, but rain seldom falls.

Ascension. Supplies.

Ships homeward bound from India, and whalers, often touched here for a supply of turtle, which were formerly abundant, particularly in February, March, and April; but since this place became a permanent naval station, turtle can only be obtained occasionally by purchase.†

There is a bay of considerable depth and extent close on the North side of the S.W. point of the island, about 3 miles distant from the anchorage. In this bay Captain Heywood found the landing safe, and on the nights of the 24th and 25th of February, turned 36 large turtles, whilst very few could be obtained by the people stationed at the bays contiguous to the anchorage; but this was long before the island was inhabited by the British as a naval station.

S.W. Bay.

A ship intending to stop at Ascension should steer round the North point of the island, which is a low rocky point with deep water near it, and may be passed within two or three cables' lengths with a commanding breeze: when passed this point, Sandy Bay, or as it is now called, Clarence Bay, will soon be seen to the S.W. It is a small bay, with a white sandy beach, having a hill like a dome a little distance inland. This hill had formerly a cross upon it, but has now a flag staff, whence it is called Cross or Flagstaff Hill. From the West point of Sandy Bay, a reef of rocks projects about 1½ miles, on which the sea breaks when there is much swell; at other times there are no breakers on it.

Anchorage in Sandy Bay.

When a ship has passed the North point of the island, she should haul up into

* In 1830, the late Capt. Henry Foster, while making scientific observations and swinging the pendulum at Ascension, made the summit of Green Mountain 2,805 feet high; Mountain House, 2,230 feet; and Cross Hill, 870 feet above the surface of the sea, *by levelling*.

† Lieut. G. A. Bedford, who visited Ascension in 1838, when in command of the Raven surveying vessel, under the orders of Capt. Vidal, says, that turtle are still plentiful in the sandy bays and coves, but that any person found taking them on the beach or when floating near the island, would be liable to the penalty of £25. They may be purchased for £2 10s. each. Sheep and goats are becoming scarce.

Sandy Bay and anchor abreast the beach in 15 or 16 fathoms sandy bottom, with Cross Hill S. by E. ½ E. or S.S.E., off shore about ¾ of a mile.* The landing place, called Tartar Stairs, is at a jetty behind an isolated rock at the western part of the bay. This rock makes a sort of division between Sandy Bay and another bay to the westward, which has also a sandy beach in some places, and may be considered a continuation of the easternmost bay. In this western part there are some detached rocks; on one of which the Egmont struck in 1771: it was found to be a very small rock, with ¼ less 3 fathoms water on it, and 13 fathoms close to it on the outside; there were 13 fathoms between it and the shore, from which it was distant about 2 cables' lengths. The summit of the rock, where the depth on it was ¼ less 3 to 5 fathoms, was not of more extent than 4 or 5 feet square.

The naval officer at Ascension has given the following account of the dangers in the bay, ascertained by a late survey:—

Dangers. From the Twelve Feet Rock, Tartar Stairs bear S.E. ½ E. distant ¼ mile. From the Fifteen Feet Rock, Tartar Stairs bear E.S.E. distant nearly ½ mile. These rocks are two, of many, which form the reef that extends from the foot of the Fort to South-West Bay, projecting to seaward more than ½ a mile from the shore, and consisting of hard pointed lava rocks, with spots of white sand. A large coppered buoy is now placed on the N.W. point of the reef, over a rock having 30 feet water upon it, and 8 fathoms close to, on the outside. From the buoy on this rock the crane at Tartar Stairs bears S.E. by E. ¾ E. distant 7 tenths of a mile. A ship must not go within the buoy, nor come nearer the reef than 10 fathoms water, for with a long swell the sea breaks on the reef, from within a cable's length of the buoy the whole way to the shore. Although the anchorage is to leeward, at the N.W. part of the island, there is often a high surf on the shore; caution is therefore requisite, as many ships have had their boats stove by the surf in landing. The summit of the

Position. mountain, or centre of the island, is in lat. 7° 58½′ S., and the anchorage of the road in lat. 7° 55′ S., and by many chronometers 8° 39′ West from James Town, St. Helena, or in lon. 14° 23½′ W., if 5° 44½′ W. be allowed for the longitude of James Town. Capt. Owen made the anchorage in lon. 14° 26½′ W. in 1826, and Major Sabine, during his scientific voyage of experiments, to ascertain the figure of the globe, by his observations, while at Ascension, made that part of the island called Barrack Square, in lat. 7° 55′ 56″ S., lon. 14° 23′ 46″ W. Capt. Foster made Barrack Square in lat. 7° 55′ 23″

Variation. S., lon. 14° 23′ W.; and the variation of the needle 20° 10′ W., which *seems* too great. Captain Fitz Roy places Barrack Square in lat. 7° 55′ 33″ S., lon. 14° 24′ 15″ W. Variation in 1836, 18° 30′ W. Lieut. Raper in discussing the longitude of this place gives

Tides. lon. 14° 25′ 35″ W. as his result. There is very little rise or fall of tide;† greatest rise 2 feet, high water at 5½ hours.

* Along the N.W. side of the island, the bank of soundings extends about 2 miles off shore; the bottom said to be rocky, where the depth exceeds 18 or 20 fathoms.

† In places where the shores are lined with a sandy beach, and this bounded by a coral reef or a range of breakers, turtle are generally plentiful; and moonlight nights are the times when the females come on shore in the greatest numbers, to deposit their eggs in the sand. If there is a reef facing the beach, and a rise and fall of tide, they wait for the rising tide to float them over it, and reach the beach an hour or two before high water, that they may have time sufficient to dig large holes in which they deposit their eggs, and return to sea about high water, or before it has fallen much on the reef. If the beach has a gentle acclivity, they dig the pits at a considerable distance from high-water mark, among bushes, small sand hillocks, or in the most convenient secret places near the beach, and then deposit their eggs in them. Some of these holes or pits are of considerable dimensions, employing the mother turtle upwards of an hour digging them. By those in search of turtle, the beach should not be frequented till near high water, or the time they are supposed to be mostly

ST. HELENA ISLAND, lies in the South Atlantic Ocean, in the strength of the S.E. trade. Before the use of chronometers and lunar observations, navigators were directed, in running for St. Helena, to fall into its parallel 50 or 60 leagues eastward of it, to lie by in the night, and steer West in the day till they made the land. This practice is no longer requisite, for most of the East India ships, homeward-bound, steer now a direct course from the Cape to St. Helena, and make the island day or night: as they generally know the longitude within a few miles of the truth, there can be little danger of missing it, although this has sometimes happened, the body and leeward part of the island being frequently enveloped in fog clouds, particularly in the night. If a ship, in such case, fall a *little* to leeward, she will easily work up to the anchorage, unless she sail indifferently upon a wind, for the current seldom runs *strong* to leeward near this island; this, however, may happen, when the trade blows strong with squalls, for a few days, which is sometimes experienced about the full and change of the moon; but this lee current is generally of short continuance. In times of war, when any of the enemy's cruizers visit St. Helena, they keep to the eastward and south-eastward of it, at the distance of 15, 20, and 25 leagues; single ships, which sail well, would avoid these cruizers, were they to make the island bearing from N.N.E. to East or S.E., and afterwards make short tacks under the lee of it, till they reach the anchorage. I have seen store ships from England make the island bearing E.S.E. directly to windward of them, at the distance of 15 or 18 leagues; they sailed indifferently, but reached the anchorage the third day after having seen the island. There are sometimes calms near it; the Mead was becalmed from the 17th to the 22d May, 1710, within 6 and 8 leagues of the East part of the island, the current setting to the eastward prevented her from being driven near it by the swell, and she did not get into the anchorage till the 24th of May.

St. Helena. Of making the Island.

This island is about three leagues in extent, nearly N.E. and S.W., of an oblong square form, about 26 or 27 miles round. The steep rocky cliffs facing the sea present a sterile and unfavourable appearance to an observer in sailing round the East part of the island, but the chasms or valleys in the interior, and likewise the hills, are fruitful, and clothed with continual verdure, except in very dry seasons, when it is sometimes burnt up for want of moisture. The highest part of the principal ridge of mountains in the centre of the island is called Diana Peak, and is about 2,200 feet high. Nearer the S.W. part, there is a hill of a conical form, called High Peak, about 50 feet less elevated than the former. On these hills, and on the high grounds, the air is always cool and pleasant; fog clouds frequently cover the Peaked Hills, or, being driven from the sea by the trade wind, strike against them, producing gentle showers, which quicken the vegetation and cool the atmosphere on the high grounds, although in the valleys on the leeward side of the island the sun is often very powerful. There is very little level ground on this island, for it evidently appears to have been forced upwards from the ocean by subterraneous fire; the abrupt ridges and chasms into which it is split seem to prove this origin, and the effects of amalgamation by fire are visible from the summits of the hills to the cavities formed by the abrasion of the surge at the water's edge.

Description.

Thunder is seldom heard at St. Helena: lightning has been at times observed in cloudy weather, accompanied by a sultry atmosphere; showers of rain are experienced in all seasons, but in some months more than others. Several years back, a heavy condensed cloud broke on the mountain over Rupert Valley, deluged it with a torrent of water, and carried a great part of the breast-work and some of the guns into the sea, although this valley is generally dry, there being no run of water in it, except in heavy rains.

Weather.

on shore. In walking along it, silence should be observed, for the smallest noise will alarm them, and those not already on shore will in such case return to sea.

Batteries. At the N.E. extremity of the island, there is a pyramidal hill close to the sea, called the Sugar Loaf, with a signal post on it. At the base of this hill there are three batteries, at a small distance from each other, called Buttermilk, and Banks Upper and Lower Batteries; a little to the S.W. of these, Rupert Battery appears at the bottom of the valley of this name, formed of a strong stone wall mounted with heavy cannon; and Munden Point divides this valley from James or Chapel Valley, where James Town, the only one on the island, is situated. Munden Fort, on the point of the same name, is strong, and with several guns placed on the heights over it, commands that side of James Valley. This valley has on the S.W. side, a hill elevated nearly 800 feet perpendicular from the sea, called Ladder Hill, with a heavy battery of guns upon it, that commands the S.W. entrance to the valley and the anchorage. James Valley is also protected by a wall, and strong line of cannon at its entrance, close to the sea. There is a battery at Sandy Bay, on the South side of the island, where boats might land when the surf is not great; but this, and the few places where landing is possible, are well protected by batteries or guns placed on the heights over them; and on the summits of the hills there are convenient signal posts all over the island, which communicate by telegraph with each other, and with the castle. Signals. When a ship is descried, a gun is fired at the signal post where she is first seen, and this is repeated by the other posts to the castle; this is called an *alarm:* if more ships appear, a gun is fired for each, till five in number, when the signal is made for a fleet; but if more than two sail appear to be steering together for the island, a *general alarm* is beat, and every person immediately takes the station assigned him, and remains under arms till the governor is informed by the boats what ships they are.

Soundings. All round the island there are soundings of 15 or 20 fathoms very near the shore, deepening quickly to 150 or 200 fathoms, about one mile from it in most places, then no ground; but South and S. by W., *true* bearing from the south point of the island, a spit of soundings about one mile broad, projects about two miles, the bottom rocky and very uneven.*

Sperry Ledge. Sperry Ledge has only $3\frac{1}{4}$ or 3 fathoms on it in some places, with 25 and 35 fathoms between it and the South point of the island, from which it is distant upwards of a mile *true* S. by W.† This is the only danger at a *considerable* distance off the island, and it is not in the way of ships unless they fall to leeward and round the South point; in such case, they should give it a berth of 2 miles till it bear about N.E., then haul up for the S.W. or western point, which is bold to approach.

Barn Ledge. Barn Ledge is about $1\frac{1}{2}$ cable's length in circuit, with 12, 8, and 6 to $3\frac{1}{4}$ fathoms on it, sharp rocks on the shoalest parts. Barn Point bears from it N.W. $\frac{1}{4}$ N., distant about $\frac{3}{4}$ of a mile, and there are 24 and 20 fathoms between it and the shore, with 32 fathoms near it on the outside. Large ships coming from S.E. should keep the small islet, called George Island, well open with Saddle Point, until Sugar Loaf Point is open with Barn Point, which will carry them clear outside of the Ledge; or keep a mile from the shore till nearly abreast of Barn Point, which is the N.E. part of the island.

Of approaching the anchorage. All ships coming from the eastward heave-to, before they pass Sugar Loaf Point, and send a boat with an officer to report them. The boat is generally hailed from the battery at Sugar Loaf Point, but she must proceed to James Town, to give the governor information, before the ship is permitted to pass the first battery at the Sugar Loaf.

* According to the survey of the bank of soundings, by Mr. G. Thoms, of H.M.S. Northumberland, in 1815.

† Purdy describes it as "a reef, two cables' length in circuit, with depths of 16 to 10 fathoms, and pointed rocks of 24 to 18 feet."

Ships of war, and all others, must observe this precaution, or the batteries will open upon them and shut them out from the anchorage, which is well defended by the forts and batteries.

When the boat is seen returning, a ship may then make sail, and pass within a cable's length or less, of Sugar Loaf Point: she should afterwards keep the shore close a-board in passing Rupert Valley, with the head-sails braced well forward, as the gusts of wind from the high land veer several points, and may take the sails aback, if precaution is not used to prevent it. When past Rupert Valley, Munden Point ought also to be kept pretty close to; but care must be taken to avoid the *sunken* rock lying off the fort about 30 or 40 yards from the Point; on which, by borrowing close to the shore, the Lascelles, Fox, and other ships struck, and were nearly lost. For several years past, there has been a small buoy with a red flag placed over this rock. When Munden Point is passed, James Valley and Town appear; off which is the proper anchorage.

Abreast of James Valley, the anchor may be dropped in from 8 to 15 fathoms, with the flag staff on the castle in James Town S.S.E., or S.E. by S. The anchorage is equally good off the East corner of Ladder Hill, or abreast of it, with the flag-staff about E.S.E. If a ship anchor in less than 14 fathoms off Ladder Hill, she should be kept at a short scope of cable, till a kedge or stream anchor is laid out in the offing to moor by; for light eddy winds and calms prevail under the hill, she may therefore be liable to swing with her stern in shore, and tail on the rocks, if there is much cable out and the anchor under 14 fathoms. In weighing from under the hill, the inner anchor must be first taken up, to prevent tailing on the rocks, which happened to the Melville Castle, and other ships. Anchorage.

Ships generally moor with a stream or kedge anchor to the offing, and sometimes with a bower anchor; those in the stream of the valley seldom swing with their sterns towards it, for a continued breeze, and frequent gusts of wind, blow from it to seaward.

If a ship anchor in 35 or 40 fathoms water, and the anchor does not hold, all the cable may be veered out, to make her ride if possible, till a convenient opportunity offer to warp farther in; but do not let go a second anchor, for if she will not bring up with one, it ought to be hove up, then sail set to work her in by short tacks, under lee of the island, till she gain proper anchorage nearer the shore.

When the wind is light, the ships swing with their heads alternately to the eastward and westward, at times, this being the effect of a current or sort of tide; but this tide is very weak, and the rise and fall on the shore at full and change of the moon is not more than two or three feet perpendicular. Tides.

Lemon Valley is about two miles to the S.W. of James Valley, and has a run of good water in it; but it is difficult to water at this place on account of the surf and rocky shore. Ships do not anchor off this valley, it being distant from the town. Abreast of Rupert Valley they sometimes anchor, but the ground is not so good as abreast of James Valley and Ladder Hill; here the bank extends about a mile from the shore, shelving with a steep declivity, when the depth is more than 40 fathoms. It is not prudent to anchor in deep water near the edge of the bank, for the gusts of wind from the valley are liable to start the anchor when a ship lies far out; nor could it avail to let go another anchor, for the steepness of the bank would prevent it from taking hold of the ground. I have seen several ships drive off the bank with two anchors down, and all the cables veered out, which occasioned great exertion and fatigue to recover them, and afterwards to work up to the anchorage. Lemon and Rupert valleys.

James Town.

James Town is situated in the entrance of the valley, and is almost obscured by the impending rocky mountains enclosing it; a row of trees behind the ramparts, and another behind the governor's house, give it a pleasing appearance. The houses are neatly built on each side of the principal street, which lies in a direct line up the valley; higher up, there is a long walk between two rows of trees, having an enclosed square on the left side, and terminated by a garden belonging to the Company. There is a run of water in James Valley, proceeding from a small spring on the left-hand side, and from a waterfall, which pours over a concave precipice, about 200 feet perpendicular, into an ancient volcanic crater at the head of the valley. Water cresses are often plentiful about the edges of this run of water, and are very serviceable to ships with scorbutic crews.

Ladder Hill.

On the right side of the valley, a zig-zag road has been cut out with great labour, for ascending Ladder Hill; persons on horseback, and carts, can pass up and down it with safety. This road leads to the governor's country-house, and to the S.W. parts of the island.

On the left side of the valley, there is a good carriage road, called Side Path, which leads to the interior, and to the eastern parts of the island; other cross roads join these two, and lead to the various plantations. The interior forms a beautiful contrast to the rugged steep cliffs which surround the island; for here, in every valley, small houses and gardens are seen with excellent pasture, and sheep or cattle feeding in different places.

Longwood.

Near the East side of the island, the plantation called Long Wood* contains the greatest quantity of level ground; there is a considerable space planted with trees here, but a scarcity of water prevailed, until General Beatson, when governor of the island, brought a supply by artificial means.

Water and other supplies.

The water that supplies the garrison and shipping is conveyed by leaden pipes from a spring in the valley, distant more than a mile from the sea. These pipes lead the water to the jetty, which has two cranes for loading boats with goods or water-casks, or to receive stores from the shipping. Firewood cannot be had in sufficient quantity, furze being the principal fuel of the islanders, and is brought from a great distance by their slaves. Cabbages, potatoes, carrots, turnips, and other vegetables and fruits, thrive well, but are sold dear, and not in sufficient quantity to supply all the shipping which at times anchor here, to procure water and refreshments.

Cattle are reared for the use of the Company's ships, and supplied to them very sparingly when a fleet arrives, the quantity reared not being adequate to the demand; a greater number, it appears, cannot be reared, for in very dry seasons the pasturage has been sometimes destroyed, and numbers of the cattle have died. The troops live mostly on salt provisions brought from England, and on fish, with which the shores abound. Poultry is generally dear, and frequently not to be had. A few hogs may at times be obtained at a high price, which, with a few bushels of potatoes,† are almost the only articles procurable when a fleet has recently departed, or is lying at the island.

* Longwood, well known of late years as the last residence and burial place of Napoleon, has become further remarkable as the spot selected for one of the Magnetic Observatories which have recently been established, in connection with the scientific expedition now absent under the command of Captain James Clark Ross.

† Most of the tropical fruits, as well as those found in Europe, thrive well in St. Helena. There is a valley near the south-east part of the island, having a run of water through it, which issues from the East side of Diana Peak. An orchard of apple trees thrives here in a remarkable manner, the branches being loaded to the ground with fruit; and on the same tree, the blossom is seen, and the apple in all the different stages, from its first formation till it is ripe and falling to the ground: some of these have a flavour equal to good English apples. The soil of this orchard is a rich black loam. On one side of this valley, the soil is ten or twelve

During the time a ship or fleet remains at St. Helena, the passengers are entertained as boarders by the most respectable of the inhabitants, at thirty shillings per day for each person. Until lately, one guinea was the daily charge for each person.

St. Helena observatory is stated by Mr. Johnson, the late resident astronomer, to be in lat. 15° 55′ 26″ S., and in lon. 5° 42′ 30″ W.; by observations of moon culminating stars, compared with corresponding observations at Greenwich. Captain Foster, of H. M. S. Chanticleer, made the fort at James Town in lat. 15° 56′ 7″ S., and in lon. 5° 40′ 45″ W. Captain Owen places James Town in lat. 15° 54¾′ S., and in lon. 5° 44½′ W. Captain Heywood measured 23° 37½′ difference of longitude between it and Trinidad, and 19° 5¼′ difference between Benguela and James Town, which would give about 5° 44½′ W. for the latter, allowing Trinidad and Benguela to be in the longitudes as marked in Captain Owen's survey. Other navigators have made James Town in lon. 5° 42′ to 5° 48′ W. by lunar observations and chronometers, measured from Ascension and other places. Observatory, James Town.

I made James Town in lat. 15° 55′ S., and by means of 32 sets of ☉ ☾ * in lon. 5° 36½′ W.* Captain Mortlock, by many sets of lunar observations, made it rather less; and Captain, now Admiral, Krusenstern, the Russian circumnavigator, made the anchorage in lat. 15° 54′ 48″ S., lon. 5° 35′ 40″ W. Variation 17½° West in 1815. Captain Foster made it 24½° W. in 1829. Captain Fitz-Roy gives the variation 18° W. in 1836.†

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# ABSTRACTS AND REMARKS, ON PASSAGES TO AND FROM ST. HELENA.

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### FIRST:—EASTERN PASSAGE.

THE EAST-INDIA Company's ship Britannia, Nov. 11th, 1803, got soundings on the African coast, in lat. 29° N., lon. 12° W. Here she was several days embarrassed with south-westerly winds, in soundings and near the coast; till in lat. 27° N., lon. 13° 20′ W. November 15th, lost sight of the land: the weather was unsettled, and a heavy swell prevailed near the coast. She passed between the island Fuerteventura and the main land, and between Cape de Verde and the islands of that name. November 25th, in lat. 13° N., lon. 20° W., lost N.E. trade; then ensued calms and faint southerly airs. December 28th, in lat. 4° 40′ N., lon. 9° 40′ W., got soundings 43 fathoms on the coast of Guinea. At noon in 50 fathoms, lat. 4° 40′ N., lon. 9° 4′ W. by lunars, and 8° 50′ W. by chronometer. Calm and faint breezes continued, with a current to the northward, till January 1804, in lat. 3° 20′ N., lon. 1° 38′ W.; then a moderate S. W. breeze commenced, which carried her to lat. 1° N., lon. 40° 30′ E., 1803-4. Passage near the African Coast.

feet deep, sloping down with a considerable declivity; deep ravines are formed in it by the rains, which wash great part of it down into the valley.

The gum tree is the only one in the island that appears indigenous; several of these grow on the hills, and a copse of them is situated at the south-west part of the island.

* It is with diffidence I have given the result of these observations, obtained by angular distances of the moon, sun, and stars, which appear to give the longitude about eight miles too far to the eastward; and this was usually the case about that time (forty years ago), occasioned, most probably, by an error of the moon's place in the lunar tables; nevertheless, there seems to be a *probable* uncertainty in the longitude of this, and several other places in the Southern Atlantic Ocean, as will be perceived by referring to the geographical situation of Rio Janeiro.

† We understand that the Time Signal for rating Chronometers is still continued; a ball being dropped at a building near Government House, at *Noon St. Helena Mean Time,* and also at *one o'clock Greenwich Mean Time.*

January 12. From hence, the wind continued between S. W. and S. by E. till in lat. 3° 0′ S., lon. 6° 30′ E. on the 23d: had then a return of calms and faint airs; the current set now to north-westward. With a moderate southerly breeze, on the 28th, stood to the W. S. W. and westward; it continued till February 1st, in lat. 7° S., lon. 1° W., and veered to S. S. E. and S. E. by S., a moderate trade, which continued till in lat. 24° S., lon. 10° W. February 15th. Had calms and faint airs till the 27th, in lat. 26° S., lon. 5° 46′ W., then a return of the trade, which enabled her to reach St. Helena 4th March.

1803. Passage eastward of Cape de Verde Islands, and near the S.W. extremity of Africa, to St. Helena.

THE CITY OF LONDON left the Isle of Wight February 1st, 1803, passed to the westward of Madeira and Canary Islands; then to the eastward of Cape de Verde Islands, on the meridian 19½° W. in passing them. Lost the northerly winds February 20th, in lat. 7° 50′ N., lon. 16° 40′ W.; had then faint airs from the northward and westward, till in lat. 5° 20′ N., lon. 11° W., the 25th; light S. W. and southerly airs then commenced, and increased to a moderate breeze when about 26 leagues southward from Cape Palmas, March 5th, which continued till in lat. 3° S., lon. 5° 30′ E., the 16th. Had then south-south-westerly breezes till the 27th, in lat. 7° S., lon. 2° E., it veered to the south-south-eastward. Made two tacks afterwards and arrived at St. Helena the 3rd April.

1803. Eastern passage to St. Helena.

THE SKELTON CASTLE, Union in company, August 10th, 1803, in lat. 16° N., lon. 25½° W., lost N. E. trade; soon after had south-south-westerly winds. Stood on the starboard tack, and crossed the equator on the meridian of London, September 7th. Light south-south-westerly winds continued: tacked at times to the westward. On the 24th reached lat. 9° S., lon. 9° E. The south-south-westerly winds continued till the 28th; in lat. 11° S., lon. 4° E., it veered gradually to S. by E., and S. S. E.; stood on the larboard tack, and arrived October 1st at St. Helena: remained three days and filled up the water.

1802. Passage eastward of Cape de Verdes to St. Helena.

THE MINERVA, Lord Eldon in company, passed the Isle of Wight, June 18th, 1802; parted company July 4th, in lat. 22° N., lon. 19° W., having passed to the westward of Palma. The Minerva passed to the eastward of Cape de Verde Islands, keeping in lon. 19° W. at the time. Lost N. E. trade 7th July, in lat. 13° N., lon. 19° 30′ W. Had westerly winds till the 12th; in lat. 7° N., lon. 16° W., it veered to south-south-westward: stood on the starboard tack, and crossed the equator 25th July, in lon. 4° E. Continued on this tack with steady breezes S. W. and S. S. W. till the 30th, in lat. 2° S., lon. 8° E.; had then calms and variable breezes at southward. Tacked occasionally. In lat. 4° 20′ S., lon. 8° E. August 6th, the wind steady at S. S. W. and S. W. by S., stood south-eastward till the 9th, in lat. 5° 22′ S., lon. 11° E. Tacked to westward: and on the 15th, in lat. 9° 30′ S., lon. 5° E., it veered to south-south-eastward. Arrived at St. Helena the 20th.

1802. Passage near the African Coast to St. Helena.

THE LORD ELDON, after parting with the Minerva, July 4th, 1802, passed between St. Anthony and St. Vincent's: the channel appeared about five leagues wide, and very safe. She passed to the westward of the other islands, and lost the N. E. trade, July 11th, in lat. 11° 30′ N., lon. 23° W. S. W. and S. S. W. winds then commenced; stood on the starboard tack, and crossed the equator 30th, in lon. 4° 30′ E. Standing on south-eastward, saw the land August 3d, and thought it the island Anno Bona, being in its latitude. Bore away to pass to leeward of it, had regular soundings from

13 to 10 fathoms; but the land opening as she stood to the northward, found it to be the main. By observations of ☾ * nearly agreeing with three chronometers, this part of the coast of Africa is in lat. 1° 37′ S., lon. 9° 8′ E. From hence with light S.W. and S.S.W. winds tacked at times. August 24th, in lat. 9° S., lon. 1° E., it veered gradually to south-south-eastward; stood on the larboard tack, and arrived at St. Helena 30th.*

1802. Passage eastward of Cape de Verde Islands to St. Helena.

THE ARNISTON left the Isle of Wight January 2nd, 1802, and passed to the eastward of the Cape de Verde Islands 20th, keeping in lon. 19° W. In lat. 7° N., lon. 16° W., lost N.E. trade 24th, then calms and variable airs prevailed. On the equator, in lon. 3° W. February 15th, the wind commenced at south-westward, and continued from S.W. to South with squalls at times, till in lat. 9° S., lon. 1° E., March 5th, it veered to south-south-eastward; stood S.W. and arrived at St. Helena 10th. From the equator this ship tacked frequently, in proceeding southward, and was never more to the eastward than 6° E. longitude.

1800. Passage from England, eastward of St. Helena, to Bengal.

THE EARL SPENCER, with six ships in company, for Bengal, July 28th, 1800, lost N.E. trade, in lat. 16° 30′ N., lon. 26° W.; had then light S.W. and S.S.W. breezes and calms. Stood mostly to south-eastward, and crossed the equator August 26th, in lon. 2° E. The south-south-westerly light winds continued, and veered gradually to South and S.S.E. on September 13th, in lat. 9° 40′ S., lon. 13° E; but did not get the steady south-easterly trade wind till in lat. 13° S., lon. 5° E., September 23d.†

1798. Passage near the African Coast to St. Helena.

THE GEORGINA, August 18th, 1798, left the Isle of Wight, lost N.E. trade, September 13th, in lat. 13° N., lon. 18° W. On the 22nd, saw the coast of Africa, in lat. 5° N., and stood to the south-eastward with south-westerly winds. October 1st, at 8 A.M., the Island St. Thomas bore W. by S. 8 leagues; from hence lay up S. by E. ½ E., 84 miles, to 8 A.M. 2d, and made the lon. 8° 14′ E., by ☉ ☾. Variation 21° W. October 3d, observed lat. 1° 9′ S., and by account 1° 10′ S., lon. 9° 7′ E., by ☉ ☾ *, the coast of Africa extending from N.W. by W. to S.E., distant from shore 3 leagues, in 15 fathoms regular soundings. A heavy swell setting towards the land.

October 4th, with the wind variable at westward, lay up S. by W. and S.S.W. along the coast, in regular soundings from 14 to 23 fathoms, off shore 3 or 4 leagues. At noon observed lat. 1° 52′ S., lon. 9° 33′ E., by ☉ ☾, distant from the shore 3 leagues. The extremes from N.E. by N., to S.E. ½ E., in 23 fathoms, no current.

South-westerly winds continued till October 18th, in lat. 8° S., lon. 7° 30′ E., then gradually veered to S. by W. and S.; and shortly after to S. by E. and S.S.E., as she stood to the westward. Arrived at St. Helena 26th.

* The Minerva made a more direct course from the Cape de Verde Islands to the southward than the Lord Eldon, and gained on her 10 days in the passage, after separating; but the former had the advantage of superior sailing.

† Three of these ships, the Melville Castle, Skelton Castle, and Travers, separated from the others in the night of the 13th of Sept., stood to the W.S. westward, and arrived at St. Helena 22d; filled up their water, sailed 29th, and arrived in Bengal river Jan. 1st, 1801. The Spencer, Walsingham, Herculean, and Tellicherry, arrived in that river Jan. 2d, very short of water and other necessaries of life; their crews greatly debilitated by scurvy, having touched at no place during a six months' passage from the Lizard, from which they took a departure July 2d, 1800. In the Anna from China, we found these ships off the Sand Heads in distress, and furnished them with water and other refreshments, and several men to assist them in working into the river.

The other three ships, by procuring a plentiful supply of water at St. Helena, prevented the scurvy; and reached Bengal river one day before their consorts.

1799. Passage near the African Coast to St. Helena.

THE GLATTON passed Portland April 3d, 1799, and lost N.E. trade May 4th, in lat. 6° N., lon. 18° W. Had then light airs and calms; S.S. Westerly breezes followed and continued at S.W. and S.S.W. June 3d at noon, Prince's Island E.N.E. about ten leagues, and three small islands from E. by N. to E. by S., the nearest distance about four leagues. Observed lat. 1° 16′ N., lon. 5° 53′ E. by chronometer.

June 5th, at noon, extremes of the Island St. Thomas, N.W. ½ N. to S.S.W., off shore about 9 miles. Observed lat. 0° 20′ N. Saw a ship and two brigs at anchor in shore.

Shoal near St. Thomas Island.

June 6th, S.S.Westerly winds working to windward to pass to the East side of the island; kept the lead going in standing towards it after dark, had 24 fathoms, tacked, and struck on a shoal in stays; hove all aback, and got off without damage. Finding a strong westerly current, bore away to leeward of the island. At midnight it bore from S.E. by E. to S.W. by W.: at day-light from S.E. to S.S.W., distant 4 leagues: at noon, S. ½ E. to E.S.E., observed lat. 0° 15′ N. S.S. Westerly winds continued. June 9th, saw at 6 A.M. very low land from E. ½ S., to S.E. by E., stood E.S.E. ½ S. 8 miles, had ground 52 fathoms mud, and tacked. At noon, observed lat. 0° 33′ S., lon. 8° 40′ E. by chronometer, the land bearing East seen from mast-head.

June 10th, at sun-set, in 27 and 28 fathoms, the southern extreme of the land S. by E. ½ E. Variable winds and a strong northerly current. June 12th, observed lat. 9° 4′ S., lon. 8° 15′ E., south-south-westerly winds: found the current set W. by S. ½ S. 1½ miles per hour. June 13th, at day-light, the land of Cape Lopez from S.S.E. to E.S.E., no ground 40 fathoms. Stood W. 10 miles to noon. Observed lat. 0° 42′ S., lon. 8° 22′ E. by chronometer. Variation per azimuth, 25° W. The south-south-westerly winds continued till 27th, in lat. 7° 30′ S., lon. 5° E., they veered to the South and S.S.E., stood to the S.W., and arrived at St. Helena 5th July.

1796. Passage to St. Helena, at a distance from the African Coast.

THE GEORGINA left the Lizard February 25th, 1796, and lost N.E. trade, March 18th, in lat. 10° N., lon. 18° W. She had then variable light winds South-westerly, and northerly currents to the equator, crossed it April 15th, in lon. 3° E. April 16th, a brisk N.N.W. breeze placed her in lat. 1° 25′ S. The south-south-westerly winds returned, and continued between S.S.W. and S. by E., till the 15th, in lat. 5° 26′ S., lon. 3° E. She tacked to the south-westward, and on this tack with S.S.E. and S.E. winds, arrived at St. Helena 2d of May.

1796. Passage to the eastward of St. Helena.

THE CARNATIC and fleet, bound to China, left the Lizard August 16th, 1796. Lost N.E. trade, September 5th, in latitude 11° 0′ N., lon. 23° W. Stood to the S.E. with south-south-westerly winds, and crossed the equator, September 19th, in lon. 5° W.; the same winds continued. On the 2d October, at noon, lat. 8° 52′ S., lon. 11° 40′ E. The wind veered to S. by W., October 9th, in lat. 11° S., lon. 8° E., stood to the westward. On the 15th, in lat. 16° 14′ S., lon. 0° 30′ W., bore away for St. Helena, to fill up the water, and anchored 17th.

1796. Comparative passages of the Queen and the fleet.

THE QUEEN parted with Carnatic and fleet, September 16th, in lat. 2° 30′ N., lon. 9° W. At noon the 25th, observed lat. 1° 31′ S., lon. 5° 16′ E., by chronometer, the Island Anno Bona bearing from E. by N. to E. by S., distant 4 or 5 leagues. Tacked, there being an appearance of shoal water, and low land projecting from the island. Had mostly south-westerly winds from losing the N.E. trade, veering at times to southward; these continued till October 9th, in lat. 8° S., lon. 3° E., then veered to S. by E. and S.S.E. Arrived at St. Helena 16th.

THE SWALLOW left Lizard Point January 3d, 1795, lost N.E. trade 29th, in lat. 10½° N., lon. 18° W. After passing in sight of the Canary Islands to the westward, had constant N.W. and westerly winds, obliged to pass to the eastward of Cape de Verde Islands. The south-westerly winds commenced at the failure of the N.E. trade, but frequently inclined to vary several points. Crossed the equator February 13, in lon. 8° W. On the 24th, in lat. 4° S., lon. 2° 30′ E., the wind veered to S. by E. From hence stood mostly to the S.W. till March 8th, in lat. 18° 30′ S., lon. 8° W., made then several tacks, and arrived 14th at St. Helena. 1795. Passage to St. Helena, by working in the open sea.

THE DUKE OF BUCCLEUGH left Porto Praya April 18th, 1794, lost N.E. trade 20th, in lat. 11° 30′ N., lon. 19° W., then had north-westerly and faint variable airs till May 6th, in lat. 5° 30′ N. saw the African Coast bearing from E. by S. to N.E. by N., distant 6 or 7 leagues, in 55 fathoms green ooze. Had now south-westerly and southerly light breezes, and saw the land daily till the 10th, in lat. 5° N.; the current set to the northward: with south-westerly light winds, crossed the equator 28th, and saw the Island Anno Bona the 31st. Was baffled near this island several days by southerly winds. June 3d, observed, lat. 1° 19′ S. Anno Bona from S. 24° E. to S. 50° E., a white rock to the southward S. 18° E., and a small isle to the northward S. 53° E., distance from the shore 5 or 6 miles. June 4th, at noon, observed, lat. 1° 19′ S. Anno Bona W. ½ N. 5 or 6 leagues. Variation 18½° W. In lat. 3° 30′ S. tacked to S.W. with the wind at S. and S. by E., and reached St. Helena 19th, without tacking. 1794. Passage to St. Helena, near the African coast, and the island Anno Bona.

THE NANCY, December 30th, 1793, left the Lizard; passed to the eastward of the Cape de Verde Islands, January 18th, 1794. Lost N.E. trade 21st, in lat. 10° 30′ N., and had ground 63 fathoms same time on the African Coast: had now light N.W. winds. In lat. 6° N. saw the land in 40 fathoms. January 31st, passed Cape Palmas at 7 miles distance; the wind then veered to S.W. Variation 19½° W. With S.W. winds, crossed the equator February 6th, which at times veered to westward. In lat. 6° S. February 13th, the wind S.S.W. and S. by W. Tacked to the westward. It veered to south-south-eastward, in lat. 8° S. on the 17th. Arrived at St. Helena 28th, without tacking. 1793-4. Passage along the S.W. coast of Africa to St. Helena.

THE ROYAL CHARLOTTE left the Start Point December 30th, 1792; January 28th, 1793, passed to the eastward of Cape de Verde Islands. The rigging covered with brownish dust, and the clouds came from south-westward in opposition to the trade wind. Lost N.E. trade, February 1st, in lat. 8° 30′ N., lon. 16° 12′ W. Had then north-westerly and light variable breezes. At 2 P.M. the 8th, saw the Grain Coast, N.E. ½ N. At 4 P.M. extremes from N.N.E. to East, distant 5 leagues, in 36 fathoms. At noon, observed lat. 4° 53′ N., lon. 9° 0′ W. by chronometers, extremes of the coast from North to E. ½ S., vessels at anchor in Settra Krow Road, N.E. by E., off shore 4 leagues in 40 fathoms. The current set south-easterly, these last 6 days. From hence steered S.E. 11 miles to 6 P.M. 9th, the coast then from N.W. ¾ W. to E.S.E. a vessel at anchor off a rocky point with breakers, like the entrance of a river, N.E. ½ E. off shore 4 leagues, in 36 fathoms. The weather hazy and the coast very low. At noon observed lat. 4° 36′ N., lon. 8° 25′ W. by chronometers, Niffou N. 1° E. Village of Little Sesters N. 60° E., off shore 3 leagues in 37 fathoms. Variation 17° W. Being nearly calm in the night, drifted into 17 and 15 fathoms sand, heard the surf on the shore and prepared to anchor; but a land breeze commenced at 3 A.M., stood out S.S.W. and soon deepened. 1792-3. Passage eastward of Cape de Verde Islands to St. Helena.

February 10th, John George, master of the Brig Queen Charlotte, came on board. He is an experienced coaster, and advises falling in with the land about Cape Palmas, and by no means to the westward of it; as the land winds are generally very faint, and if the sea wind prove scant, a ship will receive little benefit from it; there is also a constant indraught which sets towards the shore, which we experienced last night. He says, Cape Palmas should not be rounded nearer than 28 fathoms; it is very woody, and from this depth no appearance of a town is perceived on it. The coast from Cape Palmas to Cape Three Points is clear of danger, and the anchorage good. At 6 P.M. the town Grand Sesters, N.N.E. $\frac{3}{4}$ E., distant about 3 miles, in 30 fathoms. The chronometers make it in lon. 8° 11′ W., the lat. is 4° 39′ N. by noon observation.

Grain Coast.

Cape Palmas.

February 11th, by observations at noon, make Cape Palmas in lat. 4° 39′ N., lon. 7° 41′ W. by chronometers. Left Cape Palmas February 12th, had S. westerly and N. easterly currents till the 16th; the latter abated in strength, and set to the westward of N. for 3 days. On the 21st, with S.W. winds, passed to the eastward of St. Thomas. The chronometers made the North end of this island in lon. 6° 37′ E.; had still northerly currents. February 24th, spoke the Margery of Liverpool; Thomas Oliver, master, says, Cape Lopez is low, and extends far out to seaward; it makes in a low point, and is seen before the back land. All the coast is rather low, but clear up to Angola, and may with safety be borrowed on in the night to 15 fathoms. February 25th, in lat. 2° 7′ S., lon. 9° 0′ E. by chronometers, had ground 45 fathoms, and saw the appearance of land. March 3d, in lat. 5° 40′ S., lon. 9° E., tacked to westward; the south-westerly winds continued four days, veering to southward on the 8th and 9th, in lat. 11° S. On the 11th, in lat. 13° S., it veered to S. by E. and S.S.E. Anchored 13th at St. Helena.

Cape Lopez, and coast to Angola.

1792. Passage by working in the open sea, to St. Helena.

THE VALENTINE left the Isle of Wight March 9th, 1792, and passed on the East side of Palma, and to the westward of Ferro on the 20th. On the 25th and 26th kept in lon. 19° to $19\frac{1}{2}$° W. in passing to the eastward of Cape de Verde Islands. Lost the northerly winds the 31st, in lat. 7° 30′ N., lon. $14\frac{1}{2}$° W.; had then calms and light south-westerly breezes. Crossed the equator April 25th, in lon. 1° 30′ E. From lat. 4° N. to 2° N. the current set eastward. From the equator the wind was mostly from S.S.W. and S. by W. veering to S. by E. and S.S.E. at times. Worked to the southward till May 3d, in lat. 4° S., lon. 5° 30′ E., then with a S.S.E. wind stood to south-westward, and arrived 11th at St. Helena.

1791-2. Passage to the eastward of Cape de Verde Islands to St. Helena.

THE OCEAN, December 20th, 1791, left the Start Point; Jan. 11th, lost N.E. trade, in lat. 8° 40′ N., lon. 17° W. From hence had light variable winds all round, and calms with south-easterly currents at times, and during two nights much thunder and lightning. On the 20th, saw the land; at noon the extremes from Cape Mesurado N. 58° E. to N. 81° E., distance off the Cape about 9 leagues. No ground 120 fathoms. Lat. observed, 6° 7′ N., lon. 11° 0′ W. by chronometer, and 10° 50′ W. by ☉☽, which mean will place the Cape in lon. 10° 35′ W., and in about lat. 6° 27′ N. from its bearing at noon. Saw yesterday several drifts and sea-weed, but no birds of any kind. January 21st, the mean of observations ☉☽ and chronometer this day, makes Cape Mesurado in lon. 10° 36′ W. At midnight had ground 47 to 50 fathoms. At noon the land in sight from the top E.N.E. observed, lat. 5° 24′ N., lon. 10° 0′ W. by mean ☉☽ and chronometer. No ground 90 fathoms. Steered S.S.E. $\frac{1}{4}$ E. 46 miles to 4 A.M, and had ground 48 fathoms. From the course steered, did not expect to be so near land. For some days past, the wind has been mostly westerly and N.W.; it

now inclines from S.W. January 24th, mostly calm; but 10 A.M. a tornado squall blew strong for a short time with thunder, lightning, and rain. Faint south-westerly breezes, and generally N.E. currents prevailed, till in lat. 2° N., lon. 5° W., 30th, the latter began to set. North-westward, and light breezes continued mostly from S.S.W. to South. Crossed the equator, February 9th, in lon. 1° E., had then a weak current to westward. In lat. 5° 40′ S., lon. 6° 30′ E., on the 18th, the wind veered to South and S. by E., tacked to south-westward, and with a S.S.E. trade most of the way, arrived 28th at St. Helena.

THE VANSITTART, February 22d, 1821, left the Lizard, got N.E. trade 2d March, in lat. 28° N. Crossed the equator in lon. 3° 45′ E., touched at Anno Bona May 3d, left it next day, and arrived at St. Helena 23d May, being 92 days from England.* Passage by Anno Bona.

SECOND:—WESTERN PASSAGE.

THE ARNISTON and fleet lost N.E. trade, April 27th, 1795, in lat. 4° N., lon. 18° W., had S.W. and S.S.W. winds till May 5th, in lat. 1° S., lon. 15° W., and got the S.E. trade next day. She parted with the fleet, and was never to the westward of lon. 25° W., nor to the southward of lat. 25° S., and arrived June 2nd at St. Helena. 1795. Passage to St. Helena, without going far to the westward or southward.

THE DART, September 26, 1794, got westerly and S.W. winds in lat. 9° N., lon. 21° W.; these continued till Oct. 6th, in lat. 1° N., lon. 13° W., then veered to S.S.E., stood to the south-westward. In lat. 20 S., lon. 16° W., tacked to eastward on the 21st, in lat. 14° S., lon. 10° W., tacked to southward, in lat. 17° S., lon. 10° 30′ W., tacked to the eastward the 28th; afterwards, made various tacks between 15° and 19° S. lat. and reached St. Helena Nov. 8th, having never been more westward than 16° 50′ west longitude, during the passage from the equator to the island. 1794. Passage without going far west, nor so far south as the tropic of Capricorn.

THE MARQUIS OF ELY left the Isle of Wight February 13th, 1802, lost N.E. trade March 12th, in lat. 4° N., lon. 22° W., and got S.E. trade 21st, in lat. 2° S., lon. 24° W. In standing across the trade, went not to the westward of lon. 29° W. On the 4th of April, the most southerly position was in lat. 29° S., lon. 21° W., and arrived the 19th at St. Helena. 1802. Passage by the route most frequented to St. Helena.

THE PRINCESS MARY left the Lizard Sept. 12th, 1801, with a fleet, and lost the N.E. trade Oct. 9th, in lat. 21° N., lon. 26° W.; separated from the fleet and got the S.E. trade 30th, in lat. 1° S., lon. 19° W.; lost S.E. trade Nov. 9th, in lat. 18° S., lon. 35° W., had then light variable easterly winds till in lat. 31° S., lon. 11° W. on the 21st, then N.E. and northerly winds. In lat. 32° S., lon. 9° W., on the 25th, stood northward, and arrived Dec. 2d at St. Helena. 1801. Passage by going far southward.

THE HUGH INGLIS, with a fleet, left the Start Point May 4th, 1800; lost N.E. trade, June 1st, in lat. 10° N., lon. 25° W., and got the S.E. trade 16th, in lat. 2° N., lon. 28° W. Separated with the fleet, went to lat. 33° S., and arrived August 14th at St. Helena. 1800. Passage far southward to St. Helena.

* The Waterloo left the Downs two days before the Vansittart; she pursued the Western Route, and arrived at St. Helena May 3rd, making a quicker passage than the latter by 18 days.

1800. Passage by the regular track to St. Helena.

THE ARNISTON left Portland January 8th, 1800, lost N.E. trade February 13th, in lat. 6° N., lon. 21° W., and got S.E. trade 27th, in lat. 1° N., lon. 21° W. Went to lat. 29° S., and arrived April 4th at St. Helena.

1799-1800. Passage far southward to St. Helena.

THE PRINCESS MARY left Portland November 19th, 1799, lost N.E. trade December 13th, in lat. 6° N., lon. 21° 30′ W., and got S.E. trade 17th, in lat. 4° N., lon. 22° W. Between lat. 27° and 31° S. had calms and light winds, did not exceed lat. 31° S., and arrived January 29th, 1800, at St. Helena.

1799. Passage far southward to St. Helena.

THE LORD HAWKESBURY left Portland April 25th, 1799, lost N.E. trade May 19th, in lat. 7° 30′ N., lon. 18° W.; on the 30th was in lat. 3° N., lon. 5° 30′ W., and got S.E. trade June 9th, on the equator, in lon. 14° W., July 25th, in lat. 31° 50′ S., lon. 10° W., had calms and light airs several days, stood to the north-eastward with variable breezes till in the S.E. trade, and arrived August 10th at St. Helena.

1798. Passage nearly in the most frequented route to St. Helena.

THE TELLICHERRY, June 11th, 1798, left the Lizard, lost N.E. trade 30th, in lat. 12° N., lon. 26° W., got S.E. trade July 10th, in lat. 3° N., lon. 24° W. August 8th; the most southerly position was lat. 30° S., lon. 22° W.; arrived 18th at St. Helena.

1796. Passage to the eastward of Cape de Verdes to St. Helena.

THE CANTON left the Lizard April 15th, 1796, lost N.E. trade May 7th, in lat. 13° N., lon. 19° 30′ W., having passed to the eastward of Cape de Verde Islands; got S.E. trade 23d, in lat. 0° 3′ S., lon. 24° W. Three days previous to crossing the equator had strong westerly currents, on it they changed, and set strong to N.E. three days. In lat. 25° S., lon. 21° W., June 11th, with westerly winds, steered east; in lat. 23° S., lon. 11° W., the 15th, got easterly winds, then variable at N.E. and northward till in lat. 21° S., lon. 7° W., on the 20th, the S.E. trade returned, and arrived the 23d at St. Helena.

1815. Passage by the western route to St. Helena.

THE CERES, bound to St. Helena, crossed the equator the 7th May, 1815, in lon. 20° 20′ W., having lost N.E. trade in lat. 5° N., lon. 19° W., and got the S.E. trade in lat. 0° 40′ S. Went not farther West than lon. 25°, when in lat. 19° 20′ S. on the 15th. Here the wind veered to East and N.E., with which stood to S.E. and E.S.E., the winds drawing to North, N.W., and West, as we ran to the eastward. On the 23d, was in lat. 22° 15′ S., lon. 10° W., and was never farther South; from hence steered E.N.E. to lon. 7½° W. with W.N.W. and W. winds, then steered N.N.E., got the S.E. trade wind again in lat. 19° S., nearly on the meridian of St. Helena, and arrived on the 28th, having 21 days' passage from the equator.

1815. Western passage to St. Helena.

THE HEREFORDSHIRE, bound to St. Helena, crossed the equator the same day as the Ceres, on the 7th May, 1815, in lon. 22° 7′ W., and on the 15th was in lat. 17° 15′ S., lon. 27° 25′ W., being her farthest westerly position; with N.E., northerly, and S.S.E. winds, she steered first S.E. then East, nearly on the parallel of lat. 20° S. till in lon. 15° W. on the 24th. Here she got a return of the S.E. trade-wind, and steered to the southward and S.S.E. till in lat. 28° 30′ S., lon. 11° W. on the 1st June, from whence she steered E.N.E. to lon. 7½° W. with northerly winds, then N.N.E., and got the S.E. trade again in lat. 26° S., and arrived at St. Helena 8th, having a passage of 32 days from the equator, or 11 days longer than the Ceres.

## THIRD:—COMPARATIVE VIEW OF PASSAGES TO AND FROM ST. HELENA.

Winter favourable for the eastern route.

BY these examples of ships which have gone by the eastern and western routes to St. Helena, combined with other information, it appears that the eastern route might be adopted in November, December, January, February, and sometimes in March. If a ship bound to St. Helena cross the equator in any of these months, and find the winds incline from south-westward, by standing to S. E., across the Gulf of Guinea, close on a wind, and afterwards tacking as it veers to the eastward or westward of South, she may probably reach St. Helena nearly as soon as if she had proceeded by the western route. From the time of losing the N. E. trade, about 40 to 44 days to St. Helena may be considered a medium passage by the eastern route in these months, but the Swallow made it in 31 days. From the southern limit of the N. E. trade, the passage by the western route is seldom accomplished in less than 40 days. By this route 43 days seems about the medium passage, and during any month of the year it may be made in this time from the situation mentioned. The Arniston made it in 36 days in May, but she did not go more South than lat. 25° S.; and the Ceres made it in 21 days from the equator, not going beyond lat. 22° 15′ S. When the sun has great North declination, the eastern route seems precarious; and the other is more certain at all times. A ship that sails indifferently close hauled, or in light winds, should not attempt the eastern route in this season; but one that slides fast through the water in faint breezes, and holds a good wind, may probably proceed by the eastern route in any season with safety. The Britannia's passage of 95 days in the favourable season, from the southern limit of the N. E. trade to St. Helena, by the eastern route, is a singular case.* It has been the practice with ships going the western route to run far South, sometimes to lat. 32° and 33° S.; this can seldom be requisite, as it lengthens the passage; the ships which have not proceeded so far South have generally made the best passages to St. Helena.

St. Helena to England.

From St. Helena to England, the medium passage with a fleet is generally about two months, or seven weeks in a single ship that sails well.

To Cape of Good Hope.

From this island to the Cape of Good Hope the passage is about a month. The Georgina was 26 days making it in November 1798; in February 1799, she was 28 days, and in April and May, 32 days completing the same passage.

From the Cape to St. Helena.

From Cape of Good Hope to St. Helena, the passage may be estimated at 13 days; it is frequently performed in 10, and has been accomplished in 8 or 9 days.

St. Helena to River Plate and the Cape of Good Hope.

The Georgina departed from St. Helena September 18th, 1806, and carried the trade and north-easterly winds to lat. 30° S., lon. 49° W. On the 13th October she entered the River Plate, and grounded on the banks, nearly in sight of Buenos Ayres, on the 19th, but soon got off without damage, the bank where she grounded being soft mud. She got clear off the River Plate on the 21st October, and arrived at Table Bay, Cape of Good Hope, Nov. 24th, and gave intelligence of the re-capture of Buenos Ayres.

St. Helena to Benguela, and return.

THE GEORGINA left St. Helena May 22d, 1805. In lat. 27° S., lon. 6° W. the 30th, got the wind at northward and N. E. three days, steered E. by S. June 2d, in lat. 26° S., lon. 3° E., it veered to W. S. W. and S. W., and continued till in lat. 20° S., lon. 9° E. the 6th, it then veered to south-eastward. June 9th, at 7 P.M., heard the surf

* The Vansittart's passage of 92 days from England to St. Helena, in March, April, and May, by the eastern route, was also very tedious.

and saw breakers on the lee-beam, hauled off N.E.; shortly after saw the land bearing S. S. E. and sounded in 38 fathoms sand. At daylight the land from S. ½ E. to E.S.E., off shore 5 leagues in 52 fathoms. At noon the high land from N. E. by E. to S.S.W., a remarkable hill like a Turk's cap, supposed to be Mount Negro, E. S. E., off shore 7 or 8 miles, in 45 fathoms, sand, coral, and shells, observed lat. 15° 30′ S. lon., by ☾ ☉ 12° 28′ E. June 10th, steered along shore mostly N. E. and N. E. by E., with light westerly winds and hazy weather. At sun-set the coast from S. W. by S. to N. by E., off shore 6 or 7 miles; shortly after had 19 fathoms mud, steering N. E. by E. At 10 A. M. Tiger Bay, S. S. E. ½ E., and a large bay open S. by E., off shore 7 or 8 miles.

June 11th, light winds from S. W. to West and cloudy weather; at sun-set a bluff point S. E. by S.; a remarkable high round hill S. by E., off shore about 7 miles; at noon, lat. observed 13° 7′ S., account 13° 8′ S. June 12th, light westerly winds and fine weather, hove to in the night; at 8 A. M. St. Philip's Bonnet E. by S. ½ S. 3 or 4 leagues; at noon, lat. 12° 33′ S., St. Philip's Point S. E. ¼ E. 2 leagues, the extremes of the land from E. N. E. to W. S. W. ½ S. off shore about 4 miles; P. M. steered S. E. by E. into the bay: at 3, the master attendant came on board, and at 4 anchored and moored in Benguela Bay in 10 fathoms, with the best bower to seaward,

The Georgina received 84 bullocks, sailed June 21st, and had light winds from westward near the land; stood to the westward on the 22d, with a fresh breeze at S.W.: it continued at S. W. by S. and S. S. W. till in lat. 13° S., on the 26th, veered then to S. by W. and to South on the following day. June 28th, in lat. 15° 30′ S., lon. 2° 30′ W., it veered to S. by E.: arrived the 29th at St. Helena.

Georgina, September 15th, 1805, left St. Helena. In lat. 21° S., with southerly and light variable winds the 18th, stood east-north-eastward: in lat. 12° S., lon. 7° E., on the 29th, they veered to South and S. S. W., moderate and light breezes, which continued till she arrived, October 4th, at Benguela.

Sailed from hence the 22d, had the wind mostly at West and W. S. W., often variable, till in lat. 10° 30′ S., lon. 7° 30′ E., the 26th: it veered to S. W., next day to S. S. W. and South fresh breezes and squally. From the 26th to the 30th it blew strong from S. by W. to S. by E.; afterwards it continued steady at S. by E., arrived at St. Helena November 1st, having experienced a confused head-sea great part of the passage.

# WEST COAST OF AFRICA AND ADJACENT ISLANDS, WITH THE WINDS AND CURRENTS.

## COASTS AND ISLANDS.

HEADLANDS or ISLANDS on the West coast of Africa, and in the Gulf of Guinea, are sometimes seen by East-India ships proceeding by the eastern route to St. Helena, and the geographical positions of the following have been ascertained during the surveys which have been successively conducted by Captains Owen, Boteler, Vidal, and others, between the years 1820 and 1838.

Position of Headlands, &c.

CAPE NOON, lat. 28° 45′ N., lon. 11° 3′ W.

FALSE CAPE BAJADOR, or BOJADOR, lat. 26° 25′ N., lon. 14° 8′ W.

CAPE BAJADOR, lat. 26° 7′ N., lon. 14° 29′ W.

SEVEN CAPES (Centre one), lat. 24° 41′ N., lon. 15° 0½′ W.

CINTRA REEF, lat. 23° 6′ 20″ N., lon. 16° 13′ W.

RIVER OURO, South point of Peninsula, forming mouth, lat. 23° 37′ N., lon. 16° 1′ W.

CAPE BARBAS, lat. 22° 20′ N., lon. 16° 45′ W.

PEDRA DE GALHA, lat. 22° 13′ N., lon. 16° 45′ W.

CAPE CORVOEIRO, lat. 21° 47′ N., lon. 17° 0′ W.*

CAPE BLANCO, South point, lat. 20° 46′ N., lon. 17° 5′ W.

CAPE DE VERDE, lat. 14° 45′ N., lon. 17° 33′ W.

GOREE, Fort Flag Staff, lat. 14° 40′ N., lon. 17° 24′ 30″ W.

CAPE NAZE, lat. 14° 33′ N., lon. 17° 7′ W.

JOAL TOWN, lat. 14° 11′ N., lon. 16° 52′ W.

BIRD ISLAND, River Gambia, Flagstaff, lat. 13° 39′ N., lon. 16° 40½′ W.

CAPE ST. MARY, River Gambia, ditto, in lat. 13° 30¼′ N., lon. 16° 41½′ W.

CAPE REXO, or ROXO, lat. 12° 20′ N., lon. 16° 46′ W.; and 16 leagues to the south-south-eastward, off the mouths of the Jeba and Rio Grande, lies the nearest island of the group, called the Bissagos or Bijougas, which consists of more than 20 islands, encircled by shoals. Bissagos Islands.

SIERRA LEONE CAPE, extreme, lat. 8° 30′ N., lon. 13° 18′ W.

FREE TOWN CITADEL, lat. 8° 29¾′ N., lon. 13° 14¼′ W.

ST. ANN SHOALS front that part of the coast to the southward of Sierra Leone, which is comprehended between Cape Shilling and Sherboro Island. They extend between 30 and 40 miles from Cape St. Ann, their western boundary being the meridian of 13° 30′ W. The current, although westerly outside, sets sometimes very strong St. Ann Shoals.

* This name in Capt. W. F. W. Owen's survey is given to a Cape in lat. 21° 13¼′ N.

to the eastward in the neighbourhood of these shoals, rendering much caution necessary in approaching this part of the coast during the night, or in thick weather.

Cape St. Ann.

CAPE ST. ANN, the western extreme of Sherboro Island, is in lat. 7° 34′ N., lon. 12° 57′ W., having off it a group of islands called the Turtle Islands. The bank on which these islands are placed is connected with the shoals just described.

Cape Mesurada.

CAPE MENSURADO, or MESURADA, lat. 6° 26′ N., lon. 10° 49′ W., is high; and from Cape de Verde to this part of the Coast of Guinea, soundings extend to a considerable distance from the land.

Cape Palmas.

CAPE PALMAS, lat. 4° 22′ N., lon. 7° 44′ W., is rather low, like most parts of the Coast of Guinea, and it should not be rounded under 28 fathoms. Variation 20° 0′ W. (1836.) High water at full, and change at 6 h. 30 m. Rise of tide 6 feet.

Cape Coast.

CAPE COAST CASTLE FLAGSTAFF, lat. 5° 6′ 5″ N., lon. 1° 13′ 40″ W.

Three Points.

CAPE THREE POINTS, Centre cape, lat. 4° 45′ N., lon. 2° 6′ W.

St. Paul.

CAPE ST. PAUL, the western extremity of the Bight of Benin, lat. 5° 48′ N., lon. 0° 56′ E.

Cape Formosa.

CAPE FORMOSA, in lat. 4° 15′ N., lon. 6° 10′ E., is the point which separates the Bights of Benin and Biafra. It is very low, and is no distinct cape, being merely the most prominent part of that projecting land which is intersected by the numerous streams forming the delta of the Quorra or Niger. The coast from Cape Formosa extends 53 leagues E. ½ N. in nearly a direct line to the head of the Bight of Biafra, where it turns S.E. and South, forming its eastern side.

Fernando Po.

FERNANDO PO ISLAND is in the middle of the Bight of Biafra, distant 19 miles from the main land, and about 13 or 14 leagues West of the mouth of the great River Camaroons; the summit of the Peaked Mountain, at its N.E. extremity, is about 10,000 feet high; and this island is about 40 miles in length and 20 miles in breadth, or 30 leagues in circuit, inhabited by negroes; it is well watered, abounding with excellent yams, sugar-cane, and fruits.

Maidstone Bay anchorage is in lat. 3° 45½′ N., lon. 8° 45′ E. N.E. point of the island, lat. 3° 45¼′ N., lon. 8° 53′ E. West point, lat. 3° 21¼′ N., lon. 8° 25′ E. South point, lat. 3° 10′ N., lon. 8° 40½′ E., by the survey of Captain Owen.

Princes Island.

PRINCES ISLAND (Fort St. Antonio), in lat. 1° 39′ N., lon. 7° 26′ E., by Capt. Boteler, is about 40 leagues N.W. of Cape St. John, and about the same distance to the S.W. of Fernando Po. It is high, with the town and harbour of St. Antonio on the N.E. side, where bullocks, hogs, goats, and water, may be procured. The harbour is tolerably secure, with depths from 10 to 3 fathoms, but it is exposed to tornadoes. There are several rocks and islets in the neighbourhood, the principal of which are the Pedra de Gallé, about 1¾ miles N.W. by N. from the North point of the island; Diamond Rocks half a mile E.N.E. from Port Mosteoros, the northern point of San Antonio Bay; Carocha Island, or Dutchman's Cap, 1½ miles S.S.E. from the South point of the island, and the Brothers from 11 to 13 miles S.W. by S. of the same point. Variation 20° W. in 1829.

ST. THOMAS ISLAND, situated 43 leagues N.W. of Cape Lopez, is about 20 leagues in circuit, of an oval form, its North extremity being in lat. 0° 24′ N., lon. 6° 38′ E., andthe islet off its South extremity being on the equator. This island belongs to the Portuguese, and affords some articles of refreshment for ships touching at the bays on the north-eastern part, the chief of which are Man of War Bay and Santa Anna de Chaves Bay; the former is more properly a Road. The shore to the northward of Anna dé Chaves Bay being rocky and steep, should have a wide berth in passing. The small islet of Cabras lies between these anchorages, at the distance of $1\frac{1}{4}$ miles from the shore, having a channel of $2\frac{1}{4}$ fathoms inside it. There is also a $3\frac{1}{4}$ fathoms bank a little more than a mile from the shore and parallel to it. It is 2 miles in length from North to South. Its South extreme bears about N.E. from Fort San Sebastian. The Chesterfield grounded on this bank Sept. 18th, 1781. Variation in 1829 was 20° 45′ W. St. Thomas.

The anchorage in Man of War Bay is in 10 or 12 fathoms good holding ground, and in the Tornado season is preferable to that of Anna de Chaves on account of the facility of getting to sea with the wind at N.E., from which quarter the Tornadoes blow. Man of War Bay.

To approach Anna de Chaves Bay, it is better to proceed round by the South end of the island, because the current sets mostly to the northward, and the winds prevail from southward. The shore to the southward of the fort can be approached with greater safety than to the northward, but not under the distance of $1\frac{1}{2}$ miles, until the fort is brought to bear W. by N. Santa Anna de Chaves Bay.

The lead is no guide in turning in from the northward, because from no ground a ship may have 12 fathoms, and be aground before another cast of the lead can be hove.*

ANNO-BON, OR ANNO-BONA, the North point of which is in lat. 1° 24′ S., lon. 5° 37′ E., is distant about 60 leagues westward from Cape Lopez. It is about 4 miles in length and 2 in breadth, rising in two high hills, the summits of which are often clouded, and on one of them there is said to be a lake of pure water. This island is refreshed by constant breezes, which render it healthy; it abounds with tropical fruits, domestic animals, and poultry; the inhabitants are negroes of the Roman Catholic faith, converted by the Portuguese, but very ignorant. The best anchorage is at the N.E. part of the island, where is a village: on the West side, the appearance of shoal water projecting from some low land was seen by the Queen in passing. Variation 21° 6′ W. in 1829. Anno-Bon.

The Vansittart, Captain Clarence Dalrymple, on the 3d of May 1821, at 5 P.M. anchored at Anno-Bona, in $11\frac{1}{2}$ fathoms rocky bottom, with a conspicuous peak in the centre of the island bearing W. $\frac{1}{2}$ S., off shore about $\frac{3}{4}$ of a mile. The late Captain Boteler, R.N., says, the bank of soundings shelves suddenly, and recommends not to anchor in less depth than 17 fathoms, with a remarkable peak, S.S.W. $\frac{1}{2}$ W., about $\frac{1}{2}$ a mile off shore. Ships touching here should keep the lead going, the soundings being very irregular with great overfalls from 19 to 11, then $3\frac{1}{2}$ fathoms. Although the Vansittart lay in $11\frac{1}{2}$ fathoms, a small anchor was necessary to steady her and keep the bower anchor clear, for half a cable's length in shore there was only $\frac{1}{4}$ less 3 fathoms, rocks. The watering place is above a small rivulet to the S.W. of the village, and the process of getting water tedious, being first taken up in buckets and passed to the casks on the beach, and they must be warped off, as a heavy surf sets constantly upon the shore. The natives, although not strictly honest in their dealings with stran-

* The Glatton struck on a shoal here, as will be seen under that ship's name, among the descriptions of eastern passages to St. Helena.

gers, are well disposed, exchanging their pigs, goats, fowls, and fruits (being all the island affords), for linen cloth, cutlery, needles, &c.

Cape Lopez. CAPE LOPEZ DE GONZALVES, in lat. 0° 36$\frac{1}{4}$′ S., lon. 8° 40$\frac{1}{2}$′ E., is low and woody, and, with the whole of the coast, which is generally low to Angola, may be approached to 15 or 20 fathoms. The coast in lat. 2° 10′ S. is in about lon. 9° 45′ E., and here the bank of soundings deepens regularly from 16 fathoms about 3 leagues off shore, to 70 fathoms about 9 leagues off; then no bottom at 100 fathoms.

Loango Bay. LOANGO BAY (river entrance), in lat. 4° 39$\frac{1}{2}$′ S., lon. 11° 42′ E., is surrounded by red cliffs; and from the southern extremity, called Indian Point, in lat. 4° 40′ S., a reef projects nearly half way across the bay, with probably not less than 6 or 7 fathoms water on it, and the extremity is about 7 miles off shore, with Indian Point bearing S.E. There is good anchorage within the reef in 4 fathoms, $\frac{3}{4}$ of a mile from the shore; but the surf prevents landing, except in the canoes of the country.

Congo River. CONGO RIVER (Shark-Point), in lat. 6° 4$\frac{3}{4}$′ S., lon. 12° 12$\frac{1}{2}$′ E., is wide, with rapid freshes running out of it to the north-westward, particularly in the rainy season, which discolour the sea at a considerable distance from land, and carry floating islands of trees a great way out to sea. The navigation of this river is not well known,* although the expedition sent for its exploration, under the late unfortunate Captain Tuckey, has improved our knowledge of this remarkable river.

St. Paul de Loando. ST. PAUL DE LOANDO, a city of considerable extent, in lat. 8° 48′ S., lon. 13° 8′ E.; the citadel is situated on the South shore of Bengo Bay, on an island 10 leagues long, which, with a peninsula of the main, forms a good harbour, that will contain the largest fleets in perfect safety. This is the chief settlement of the Portuguese on the coast of Angola, and the best place for a ship to obtain refreshments. The articles most appropriate for trade here, and at other parts of this coast, are coarse blue checked India cloths, English white coarse cottons, glass ware, and cutlery of inferior quality, ready-made woollen coats, and shoes.

Benguela Bay. BENGUELA BAY, Cape Ledo, is in lat. 9° 46′ S., lon. 13° 12′ E., by Capt. Owen's survey. Fort Flag-staff in lat. 12° 33$\frac{1}{2}$′ S.,† lon. 13° 20′ E., by the same survey, or 19° 5$\frac{1}{4}$′ E. of James Town, St. Helena, by Captain Heywood's chronometers, in H.M. ship Nereus: it is called also the Bay of St. Antonio, St. Philip of Benguela being the chief Portuguese settlement on the coast of Benguela.

The Nereus, on the 29th January 1811, anchored in 10 fathoms, with the Flag-staff just touching the East side of the church, bearing S. 54° E., distant 1$\frac{1}{4}$ miles.

The Georgina, 12th June 1805, moored in 10 fathoms, with the northern extreme of the land N. by W. $\frac{1}{2}$ W., St. Philip's Bonnet W.N.W. $\frac{1}{4}$ W., the Flag-staff of the fort S.E. $\frac{1}{4}$ E., off shore 1$\frac{1}{2}$ miles, and found two ships and seven brigs in the road, under Portuguese colours.

This bay is formed on the S.W. side by a peninsula, the extremity of which is called

* The freshes run almost constantly out of the Congo or Zahir River all the year, sometimes at the rate of five and six miles an hour, there being little or no tide; and as there is upwards of 100 fathoms water in the middle of the entrance, the difficulty of navigating it is great; its extent and source are unknown to Europeans.

† M. D'Urville made the lat. 12° 31′ 42″ S. Mr. De Mayne made it 12° 33′ 6″ S.

Punta de Chapeo, from a single clump of trees on it, the shore on each side being barren; and this clump is called St. Philip's Bonnet, or Hat. The extreme points of the bay extend from each other about 7 or 8 miles; and from a transit line joining these points, the bay is about $2\frac{1}{2}$ miles in depth to the beach: upon that transit line, and halfway between St. Philip's Bonnet and the low sandy point of the bay, the depth of water is 17 fathoms, from hence decreasing gradually to 6 fathoms within a mile of the shore.

The surrounding country abounds with excellent fruit and vegetables in the proper season, but the water is not of the best quality, and is procured with some difficulty, by bailing it out of wells of considerable depth, distant about 300 yards from the beach, where the surf runs high at times. The Nereus was well supplied with bullocks, sheep, goats, hogs, fruit, and vegetables; and plenty of fine fish were caught with the seine in the bay. Variation 22° W. in 1825.

The Company's ship Thames, outward-bound to Bengal, after passing to the eastward of the Cape de Verde Islands, had light westerly and S.S.W. winds, with which, and a strong easterly current, she was drifted along the coast of Africa, at times approaching it within 60 miles, until abreast of Benguela, where she anchored 28th September 1822, with the hope of procuring vegetables, &c., but no vegetables could be got at this season, and they only got a supply of fish, bullocks, and sheep, and found great difficulty in bringing off a few tons of water. Captain J. Crawford, of the Bombay Marine, at this time a passenger in the Thames, made the flag-staff of Benguela in lat. 12° $32\frac{1}{4}'$ S., lon. 13° $30\frac{3}{4}'$ E. by mean of four chronometers, from observations taken on shore with an artificial horizon, and describes the bay to afford good anchorage in mud and sand, although much exposed, being only a small indentation in the land. The town and fort are in a state of decay, garrisoned by about 300 native troops, having mostly European officers over them, banished hence by the mandate of their sovereign. This place is chiefly supported by trading in slaves, who are mostly carried to the coast of Brazil: as liquor shops are numerous, ships touching here ought not to let their seamen visit the town without great circumspection.

CAPE NEGRO, the Pillar, in lat. 15° 41′ S., lon. 11° 53′ E., by Capt. Owen's survey, is of a level, brown, sandy appearance, discernible when clear at 7 leagues distance, but the atmosphere is generally hazy; in passing at 3 leagues distance, in regular depths of 12 to 15 fathoms, no projecting headland was seen in the Nereus. Cape Negro.

Between Benguela Bay and Cape Negro, there are several bays near the former; with Village Bay, Turtle Bay, and Little Fish Bay, nearest the Cape. Village Bay is in lat. 14° 10′ S., where the Abington and Josiah anchored in 20 fathoms in October 1703, and got plenty of wood and water from a pool near the shore. Bays.

PORT ALEXANDER, Sandy North point, in lat. 15° 47′ S., lon. 11° $46\frac{1}{2}'$ E., is formed by the peninsula of Cape Negro, which terminates in a curve to north-eastward, bounding the entrance on the West side. This port has from 12 to 20 fathoms water in it, and seems to be well sheltered from all winds. Port Alexander.

FISH BAY, North Point, in lat. 16° 30′ S., lon. 11° 41′ E., formed by a narrow sandy peninsula on the West side, called Tiger Peninsula, has even soundings from 12 to 6 fathoms, being a spacious and safe harbour. No fresh water being procurable on the coast, from lat. 16° to 31′ S., these bays are seldom visited except by whalers. Fish Bay.

Cape Frio.

CAPE FRIO is in lat. 18° 23′ S., lon. 11° 57¼′ E., and Cross Cape in lat. 21° 50′ S., lon. 13° 52′ E., by Capt. Owen's survey.

Walvish Bay.

WALVISH, OR WALWICH BAY, Pelican Point, in lat. 22° 52′ S., lon. 14° 22′ E., is spacious and well sheltered, except from northerly winds, which seldom blow here; and it is frequented by whalers. Soundings extend a considerable way off the coast, from hence to Cape Negro.

Sandwich Harbour.

SANDWICH HARBOUR, in lat. 23° 30′ S., is small, with only 3 fathoms water in it.

HOLLAM'S BIRD ISLAND (centre) is in lat. 24° 37½′ S., lon. 14° 27¼′ E. Alligator Rocks, said by Capt. Wood, of H. M. S. Garland, to be 6 leagues off shore, in lat. 24° 38′ S., having breakers to the S.W. about 2 leagues, in about lon. 14° 14′ E.

Spencer Bay.

SPENCER BAY, in lat. 25° 46′ S., has 5 and 6 fathoms water; but although sheltered by Mercury Island on the West side of the entrance, it is rather exposed to northerly winds.

Angra Pequena.

ANGRA PEQUENA (Little Bay), or Santa Cruz, in lat. 26° 38½′ S., lon. 15° 2½′ E., has 3½, 4, and 5 fathoms water; the best and deepest anchorage is on the East side of the isles at its entrance, in 4 or 4½ fathoms, sheltered from all winds.

Elizabeth Bay.

ELIZABETH BAY is formed by Possession Island, which lies about 3 miles from the land, having a channel between them of 8, 9, and 10 fathoms; and the South point of this island is in lat. 26° 38½′ S., lon. 15° 7½′ E. A ship may anchor under the island, and be sheltered from West to S.W. This place is the boundary between the Kaffer and Hottentot countries.

Cape Voltas.

CAPE VOLTAS, in lat. 28° 44′ S., lon. 16° 26½′ E., is to the South of the Orange or Giarep River; an extensive shoal projects from it, and to the South, adjoining to the coast, there are several islets. Orange River, dry-bar, is in lat. 28° 38½′ S., lon. 16° 22½′ E.

Orange River.

To the southward of Cape Voltas, soundings extend far out, for the Hanover, from India, on the 2d June, 1715, in lat. 29° S., perceiving the water discoloured, sounded in 95 fathoms fine sand, and at noon had 115 fathoms in lat. 29° 6′ S.; after steering N.W. 8 miles, the land was seen at 4 P.M. bearing N.E. by E., distant, supposed, about 15 leagues.

Cape Donkin.

CAPE DONKIN is in lat. 31° 54¼′ S., lon. 18° 14¼′ E., by Capt. Owen's survey.

## WINDS AND CURRENTS.

ALONG the Coast of Sierra Leone and the Grain Coast to Cape Palmas, N.W. and N.N.W. winds prevail. From thence, across the Gulf of Guinea to Cape Lopez, the winds are generally from S.W. and southward. Towards the coast, in South latitude,

they are observed near the land to take a more westerly direction, often prevailing from S. W. and W. S. W. along the African Coast between Cape Lopez and Benguela. As the distance is increased from the coast, the winds veer in proportion more southerly; it has been said, that the boundary of the winds which blow from South to S. W. along the West coast of Africa to lat. 28° S. is an imaginary line drawn from Cape Good Hope to Cape Palmas. It may be observed, that the winds are found, in general, to draw to the S. by E. or S. S. E., considerably to the eastward of this imaginary line; some ships, however, have been perplexed with winds from South and S. by W. between 7° and 15° South lat. until several degrees to the westward of this imaginary line, although this seldom happens. Winds from Cape Lopez to Benguela.

From Cape Lopez to Sierra Leone, a dry, parching easterly wind sometimes blows along the Coast of Guinea in December, January, and February, called the Harmattan by the Fantees, a nation on the Gold Coast. In these months, the Harmattan may appear at any period of the moon, continuing sometimes only 1 or 2 days, at other times 5 or 6, and has been known to last 15 or 16 days. There are generally 3 or 4 returns of it every season, and it usually blows moderately. On the Coast of Sierra Leone, its direction is from E. S. E., and the same farther northward: on the Gold Coast from N. E., and at Cape Lopez and the River Gaboon from N. N. E. The Harmattan is accompanied by a dark haze, and it is a cold, parching wind, destructive to vegetation, but purifies the atmosphere from infectious exhalations. Harmattan.

Preceding and subsequent to the rainy season, on the Coast of Guinea, tornadoes may be expected; these are hard squalls from East and E. S. E. accompanied with thunder, lightning, and much rain. In the Gulf of Guinea, faint breezes and calms are also frequent at various seasons of the year. Tornadoes.

In the fair season, on the coasts which embrace the Gulf of Guinea, land and sea breezes prevail; but the winds blow almost constantly from the sea during the rains. Land and sea breezes.

The currents are variable on the Grain Coast; in the S. W. monsoon, when the sun is far to the northward, they frequently run to the N. W., but at other times often to the S. E. They set mostly between North and East across the Gulf, from Cape Palmas to Cape Lopez; particularly from the Coast, to lat. 2° N. From lat. 2° N. across the equator to lat. 1° or 2° S., the current frequently sets strong to the westward; this is mostly experienced about the equator, and a little to the northward of it, when the sun has great north declination. Currents.

About Cape Lopez, and from thence along the coast to the southward, the current often sets to the northward; at other times it is variable, with strong ripplings near the rivers in the rainy season; when the freshes from these rivers, added to a body of water being driven towards the coast by the S. W. wind, is turned backward and forms a westerly current. In the dry season, there is often no current.*

Major Sabine, during his scientific voyage, in H. M. S. Pheasant, 1822, made the following observations on the Gulf of Guinea current and equatorial currents. Passing between Cape Mount and Cape Three Points, in April and May, the Pheasant experienced an acceleration of 180 miles by the Guinea current, which, in the season when S. W. winds prevail on this part of the coast, runs with considerable velocity in the Major Sabine's account of them.

* Within the space, *lengthwise*, between Cape Verde and Cape Mesurado, and in certain places to the extent of 70 leagues off shore (50 off Sierra Leone), a regular change of winds and currents takes place according to the seasons; that is to say, a N. E. or North wind and S. E. current from September to June; and the rest of the year S. W. winds and N. E. or Northerly currents ......... The *Guinea Current* may be taken at 60 leagues in breadth; its greatest rapidity is during the season of S. W. winds, in the sea lying west of Sierra Leone and south of the Cape Verde Islands.—*Rennell on Currents*, p. 38.

direction of the land from Cape Palmas to the eastern part of the Gulf of Guinea. The breadth of this current fronting Cape Palmas varies with the season, and has been found to extend to 180 miles; in its subsequent course to the eastward it enlarges to nearly 300 miles, and occupies the whole space between the land on one side, and the equatorial current on the other, running in an opposite direction. The velocity off Cape Palmas and Cape Three Points, and in the vicinity of the land in the month of May, was about two miles per hour; farther to the eastward where the Pheasant crossed its breadth, from Cape Formosa to St. Thomas, and where its velocity had been much diminished by the dissipation of its waters, the rate was rather less than one mile per hour, and the direction a little to the southward of East.

The general temperature of the stream in mid-channel, in the Gulf of Guinea, in April and May, was about 84°, diminishing from 83° to 82° on its southern verge, where it is in contact with the colder water of the equatorial current; and occasionally between 79° and 81½° on its northern side, in the proximity of the land. In the passage between the River Gaboon and the Island of Ascension, being 1,400 miles of distance, the Pheasant was carried 300 miles in the direction of her course by the current.

The equatorial current commences much farther to the eastward than is usually imagined, and the Island of Anno Bona appears to be always environed by it; while Prince's Island is equally surrounded by the Guinea current. St. Thomas being in an intermediate situation, the sea around it is occasionally subject to both currents.

In consequence of the southerly trade-wind in the vicinity of the African continent, the water impelled before it, which forms the commencement of the equatorial stream, arrives from a more remote southern parallel, and is, therefore, of a colder temperature than the drift-water which successively falls into it from the S. E., impelled more obliquely to the meridian, and consequently arriving from latitudes less distant from the equator: the temperature of the stream, therefore, varied from 72½° to 74°, whilst that of the drift-current was 77½° and 78°.

But the distinction of importance and utility to navigation is between the waters of the equatorial and Guinea currents; which exhibit the remarkable phenomenon of parallel streams, in contact with each other, flowing with great velocity in opposite directions, and having a difference of temperature of 10° or 12°. Their course continues to run parallel to each other, and to the land, above 1,000 miles; and, according as a vessel, intending to proceed along the coast in either direction, happens to be in the one or the other of these currents, her progress will be accelerated or retarded from 40 to 50 miles per day.

Rainy season. The rains set in on the Coast of Guinea in May, and continue till October; as they do also on the West coasts of both peninsulas in India, and others situated to the northward of the equator, which have the ocean open to the West or S. W.

The rainy season to the southward of the equator, on the Coasts of Loango, Congo, and Angola, is the opposite to that on the Coast of Guinea; the sun in the northern hemisphere bringing the rainy season on the latter coast, at the time that it is the dry season on the former; the southern sun producing the rains to the southward of the equator.

# BRAZIL COAST.*

## HEADLANDS AND HARBOURS.—WINDS AND CURRENTS.—PASSAGES OF SHIPS.

### HEADLANDS AND HARBOURS.

CAPE ST. ROQUE is the name given in all the older charts to the N.E. point of Brazil, but the survey of Baron Roussin has shewn, that this name properly belongs to a less remarkable point, 25 miles further South, in lat. 5° 28′ N., lon. 35° 17′ W. The N.E. point of Brazil is Point Toiro, or Calcanhar, in lat. 5° 8′ N., lon. 35° 31′ W. Cape St. Roque appears to be in about lat. 5° 10′ S., lon. 35° 40′ W. *Cape St. Roque.*

CAPE LEDO (Fort Cabedello), in lat. 6° 57′ S., lon. 34° 50′ W.,† forms the outer extreme land bounding Parahyba River, which is a place of considerable trade, having 1½ fathoms on the bar at low water. Between Cape St. Roque and this place, the coast is generally lined by reefs, with soundings extending to a considerable distance; but near Cape Ledo the bank is rather more steep, although 10 and 12 fathoms are got with the cape bearing West, distant 10 or 12 miles. Reefs project to a considerable distance from this part of the coast, rendering caution indispensable when approaching it in the night. *Cape Ledo, and Parahyba river.*

CAPE ST. AUGUSTINE, in lat. 8° 21′ S., and about lon. 34° 50′ W., is formed of a ridge of high land projecting into the sea, having the fort N.S. de Nazareth on the summit of the hill over the cape. *Cape St. Augustine.*

PERNAMBUCO, in lat. 8° 4′ S., lon. 34° 52′ W., and about 6 leagues northward of this cape, is a place of great trade, being the port of the city of Olinda:‡ the entrance is narrow, with 1½ fathoms in it at low water, nor is there room for many ships inside: a pilot is necessary to conduct a ship into this port. The reef which forms the harbour extends nearly North and South, having Picaõ Fort and Light-house on its northern extremity, and ships, steering westward for the entrance of the harbour, must haul close round this extremity of the reef, and be ready to drop their anchor in the harbour, which stretches southward within the reef. Large ships in want of refreshments may anchor in the road well out, and get the needful supplies, where they *Pernambuco.*

* The positions here given of the Brazil Coast, which will be found to differ from those in former editions of the Directory, are adopted chiefly on the authority of Baron Roussin, confirmed by the observations of Captain Fitz-Roy and others.

† General Brisbane and Professor Rumker made this cape in lat. 6° 53′ S., lon. 34° 43′ W. by chronometers in 1821.—The Cape is called Point Balea in our recent charts.

‡ This small city is 3 miles from Pernambuco, situated on a small hill, and its aspect is beautiful when viewed from the sea, occasioned by its whitewashed churches and convents, which are visible at a considerable distance; and the gardens and trees, being interspersed among the houses on the top and sides of the hill, add greatly to the beauty of the landscape.

will be enabled to proceed to sea on the appearance of blowing weather. Captain Hewett, R.N., who surveyed the road in 1815, says that ships should give Olinda Point a berth of at least 3 miles, keeping in 10 fathoms; the reef in many parts being steep to; and in coming from the southward, Olinda Point should not be brought eastward of North till Fort Picaõ bears N.W. by N.

From Cape St. Augustine, the coast takes a direction about S. by W. several leagues, then south-westerly to the Reefs of St. Francisco, in about lat. 10° 20′ S., which line the shore, having a passage within them for small vessels. From hence, the coast lies nearly S.W. to the Bay of All Saints, having a reef fronting it in many places, forming a few intermediate harbours for small vessels.

If a large ship make the land about Capes Ledo or St. Augustine, it will be prudent not to approach it under 25 or 20 fathoms in proceeding to the southward; for with due caution the soundings are generally a sufficient guide.

Bahia. BAHIA DE TODOS OS SANTOS (Bay of All Saints), or Harbour of St. Salvador, is an extensive basin with several islands in it, the entrance being bounded by the large island of Itaparica on the West side, and on the East side by the peninsula on which the city of St. Salvador is built. Cape St. Antonio, or Cape St. Salvador, is the S.W. extreme of the peninsula, on which stands Fort St. Antonio Lighthouse, in lat. 13° 1′ S., lon. 38° 31′ W.* From the Cape a shoal bank projects southward to the distance of nearly 5 miles, called the Shoal of St. Antonio, on which the tide makes ripplings; the general depth on it is 4 fathoms; there are, however, several shoaler spots, and one near its South extreme, with only 13 feet. The Island Itaparica is lined with a shoal bank that bounds the West side of the channel, and must be avoided: the depths are 10 and 12 fathoms in the fair track, a little outside the entrance of the harbour, deepening to 15 and 20 fathoms farther in.

Directions. With a fair wind, when Cape St. Salvador is approached within 4 or 5 miles, it should be brought to bear N. by E. or N. by E. ½ E., and when Fort St. Antonio is on this bearing, steer N. ½ E. or N. by E. direct for the harbour, borrowing on the Cape bank if the wind be easterly; or as soon as Montserat Point (which is the first point to the northward on the East side of the harbour) is seen open with the Cape Point, steer right in.

The pilots say, that a ship may borrow on the Cape Bank to 5 fathoms with a steady breeze, but not under 15 fathoms with little wind. If the wind be at E.N.E. or N.E., a ship may work in with safety, taking care to avoid the western shore; and a pilot will come off, if the signal be made. Having entered the harbour and neared Fort Balco, pass it in 14 fathoms about ½ mile distant, then anchor abreast the city, in 8, 10, or 12 fathoms, about 1 or 1½ miles off; the bottom is sandy in some places.

Anchorage. The Glatton, moored in 8 fathoms, sand-shells and coral, had the flag-staff of the fort abreast the city bearing E.N.E. ½ N., distant 1 mile, Fort Balco S. ½ W. about 1 mile, extremes of the Island Itaparica from N.W. by W. to W.S.W. distant 4 or 5 miles. Tides. High water at 3 hours on full and change of moon.

This port is sometimes visited by outward-bound East-India ships in want of refreshments, but its situation being nearly in the middle of the S.E. trade, navigators are cautious of touching here, thinking they may afterwards find it difficult to get to the

* Capt. Hewett made it in lat. 13° 0′ 30″ S., lon. 38° 24′ W.—Baron Roussin has placed the lighthouse in lat. 13° 0′ 48″ S., lon. 38° 31′ 48″ W., and Major Sabine is said to have made it lon. 38° 33½′ W. in 1822. Lieut. Raper adopts 38° 31′ 50″ W.

southward on account of adverse southerly winds, supposed to blow along the coast from March to September; but the East-India ships have usually proceeded from this port to the southward without difficulty, even in the most unfavourable months, June, July, and August; for the wind generally draws well to the eastward here, and more so, as you proceed to the southward. Capt. Hewett says, that between September and March the winds generally prevail from N. by E. to N.N.E.: between March and September from E. by N. to E.S.E., but are influenced by the proximity and temperature of the land; and about the equinoxes, especially when the sun is advancing to the northward, calms and variable light winds are experienced near the coast, particularly between Abrolhos and Cape Frio.

PORTO SEGURO, in lat. 16° 27′ S., is a place of considerable trade, but will not admit large ships, and the road outside is said to be foul ground: shoals lie about 5 miles to the E.N.E. of the river's mouth, which must be left to the northward in proceeding to the road. If a ship touch here, a pilot will be necessary. Porto Seguro.

ABROLHOS, or BRAZIL BANK, extends from lat. 17° to 20° S., having various depths from 20 to 60 fathoms, and on the parallel of 18° S. it projects about 40 leagues East from the coast, or to lon. 37° W.; but farther to the northward it approaches much nearer to the coast. It seems not to be a continued bank, but probably is formed of several detached parts, with deep water between them, as soundings have been got by several ships as far to the eastward as 36°, while others between that meridian and the main bank have sounded in from 100 to 280 fathoms with no bottom. Abrolhos or Brazil Bank.

The Royal Charlotte, Brunswick, and Glatton, left St. Salvador 5th June, 1803, and on the day following, in lat. 16° 0′ S., lon. 37° 48′ W., had soundings of 22 and 25 fathoms; steered from thence 15 miles S.S.E. to S.E. gradually deepening to 60 fathoms.

The Warren Hastings, 3d June, 1803, in lat. 16° 0′ S., lon. 38° 42′ W. by lunars, and 38° 54′ W. by chronometers, had 23 fathoms; then steered between S. ½ E. and S.S.E. 19 miles, in 22, 23, 25, 30, and 35 fathoms, and soon after had no ground at 70 fathoms.

The David Scott, 28th June, 1810, in lat. 16° 35′ S., lon. 38° 26′ W., had from 19 to 24 fathoms; the coast in sight, bearing W.S.W., distant about 17 leagues.

The soundings of these ships appear to have been on the northernmost part of the Brazil Bank, which is probably a detached part projecting about 26 or 28 leagues from the coast, as all these ships lost soundings, steering south-south-eastward.

The Busbridge, 5th June, 1792, in lat. 18° 35′ S., lon. 35° 54′ W. by chronometers, and 35° 56′ W. by lunars, had soundings 30, 32, and 33 fathoms coral rock, probably near the eastern verge of the Bank of Abrolhos.

The Dorsetshire got no soundings, in passing not far from the situation where the Busbridge had ground.

The Sir Edward Hughes, 13th June, 1802, in lat. 17° 18′ S., lon. 36° 15′ W., no ground with 100 fathoms line; steered S.E. by S. 32 miles, no ground 100 fathoms; steered S.E. 22 miles, no ground 65 fathoms.

Upon this outer Bank of Abrolhos, to the eastward of the islands of the same name, there is no danger, and it is a guide for ships approaching the coast, although there appear to be deep gaps or chasms in it, particularly to the northward of lat. 18° S.

ABROLHOS ISLANDS, in lat. 17° 58′ S., lon. 38° 34′ W., distant about 12 leagues from the coast, consist of 4 small isles near each other, with some rocks and shoals adjoining: they are destitute of water, but abound with rats and turtle. There is said to Abrolhos Islands.

be 6 or 7 fathoms off the East point of the easternmost island, which is the largest, and that a ship might anchor between it and South Island; but Captain Isbister, in hauling round the South side of the latter, in search of turtle, got his ship aground on a coral shoal. They are apparently safe to approach from the eastward, as Captain J. Crabtree, in January 1811, passed outside of them at 8 or 9 miles distance, and had not less than 15 fathoms regular soundings, and they seemed clear of danger on that side.

Captain Fitz-Roy describes these islets as rather low, but covered with grass, with a little scattered brushwood; the highest rising about 100 feet above the sea, and the soundings in their vicinity so very irregular, that little dependence can be placed on the lead. He makes the eastern summit of the principal islet in lon. 38° 41′ 30″ W.

Inner Channel. To the West of the Abrolhos Islands, there is a channel about 3 leagues wide, with a depth generally from 9 to 14 fathoms coral, sand and mud; there are several spots in the southern part, however, which have not more than 6 or 7 fathoms. On the West side towards the land, this channel is bounded by shoals and rocks above water, called the Paredes; it is seldom used except by coasters.

Coast to the southward. From Abrolhos Point to Espirito Santo, the coast lies about S. by W., and is safe to approach. When round Espirito Santo, which is in about lat. 20° 18′ S., the coast trends more to the S.W. to Cape St. Thomè, situated in lat. 22° 2′ S. This part of the coast should not be approached too closely on account of several small islands off it, and on account of the shoals off the Cape itself. The shoals of St. Thomè are but imperfectly known, and their extent to seaward from the Cape has been variously reported from 8 to 30 miles.

Morley Bank. The Morley Bank, on which the ship of this name lost her rudder, is said to extend 7 or 8 leagues to the north-eastward of Cape St. Thomè, being nearly 5 leagues in diameter, of circular form, with irregular rocky soundings, and in one part only 3 or 4 feet. Its southern edge is in a line with Cape St. Thomè, bearing nearly E.N.E. To the south-westward of Cape St. Thomè lie the three Isles of Santa Anna, about two leagues or more from the shore, affording shelter and good anchorage under them; and fresh water may be got at a village to the northward of them.

The large bay in which these islands are situated, formed by Cape St. Thomè and Cape Busios, is called the Bay of Santa Anna. Several rivers fall into it, and its shores are low, like the coast about Cape St. Thomè and to the northward of it. The soundings in the outer part of the bay are from 25 to 30 fathoms, decreasing with tolerable regularity towards the islands and the main.

Cape Busios. Cape Busios, in lat. 22° 46′ S., lon. 41° 48′ W., is about 22 leagues S. W. $\frac{1}{4}$ W. from Cape St. Thomè, and is the north-eastern point of that projecting portion of the coast which forms Cape Frio, from which it bears N.N.E. distant about 5 leagues. There are several groups of small islands off this part of the coast. The White Islands, about two miles off shore to the northward of and within Cape Busios; the Anchor Islands, three miles East of that Cape; and the Papagayos or Parrot Islands, midway between Cape Busios and Cape Frio.

Cape Frio. CAPE FRIO is an island about $2\frac{1}{2}$ miles long from N.E. to S.W., and $\frac{3}{4}$ of a mile wide, having between it and the main the anchorage of Port Frio, which consists of several bays with a depth of water varying from 17 to 4 fathoms. The principal entrance to Port Frio is to the N.E. between the north end of Frio Island and the little isle of Porcos; it is more than $\frac{1}{2}$ a mile wide, with a depth in the centre from 17 to 24 fathoms. The southernmost bay, which is formed by Frio Island and the nearest main land, has a bank of 1 and $1\frac{1}{2}$ fathoms across it, on which the sea breaks in N.E. winds;

at the head of this bay, however, there is anchorage in from 3 to 7 fathoms, the entrance to it being to the S.W., through the channel formed by the West point of Frio Island and the main: this channel is deep, but is less than half a cable in width.

Outside the Cape, S.W. and N.E. winds produce currents in the opposite directions, which run from $\frac{1}{2}$ to $1\frac{1}{2}$ knots, and usually precede the wind. With S.W. winds there is a S.W. eddy in-shore. Ships bound for Rio Janeiro always steer to make Cape Frio, which at a distance appears like two paps or hummocks. The South extreme of Cape Frio Island is in lat. 23° 1′ S., and in lon. 41° 50′ W., or 1° 4′ E. from Rat Island in Rio Janeiro Harbour, by Captain P. Heywood's chronometers: but Captain Beechey made it in lon. 41° $58\frac{1}{2}$′ W., or 1° 15′ E. from Gloria Observatory. Captain Foster, in H.M.S. Chanticleer, in 1828, made Cape Frio in 41° 58′ 15″ W. by mean of 17 chronometers; this is adopted by Lieutenant Raper. The Honourable Captain de Ros, R.N., who surveyed Porto Frio in 1832, makes the lat. of the Cape 23° 1′ 6″ S.

The land about the Cape is of middling height, appearing at a distance like islands; to the northward, the land is higher. From Abrolhos Bank to this place, soundings are generally got at a moderate distance from the coast.

RIO JANEIRO HARBOUR is about 20 leagues West from Cape Frio, and ships approaching the latter must be careful not to run into the bay to the northward of the Cape with the wind East or S.E. in the night: this has happened to several ships by mistaking the latitude of the Cape, and being ignorant of the currents. Rio Janeiro.

In steering from Cape Frio to the westward, keep 3 or 4 leagues off shore, and when the distance is 9 or 10 leagues West from Cape Frio, you will see the Sugar-Loaf, if clear weather, and soon after Redonda, or Round Island, bearing about West, and appearing like a small hummock, also the extremity of the land to the westward: steer direct for it, and you will soon see Raza Island, and in sailing along will pass the Maricas, which are 2 or 3 small low islands near the shore, distant 3 leagues or more from the entrance of the harbour. Round Island bears from Cape Frio W. $\frac{1}{2}$ S., distant 64 miles, and is in shape a perfect haycock.

Raza Island is low, and seems as if sliced off to the northward, by which it probably got the name of Raza. When bearing to the westward, it resembles a slipper. There is now a lighthouse on its most elevated part, exhibiting a light which revolves every three minutes, shewing a bright and red light alternately. The soundings are 30 and 35 fathoms near these islands on the outside and to the eastward of them. Steering on for Raza Island, you will see the Islands Paya and Maya,* which are 5 or 6 miles eastward of the harbour, and lie near the shore, off Point Taipu:—Paya, the outermost, is on with the Sugar-Loaf bearing N.W. by W. $\frac{3}{4}$ W.; Maya is within it, and there is another small islet within these, so near the shore that it is not always perceived. Raza Island bears from Round Island E. by N. $\frac{1}{4}$ N., and from the Sugar-Loaf S. by W.

The Great Channel leading to the harbour is between the Paya Islands to the eastward, and Raza Island westward, and when these islands are approached, the entrance of the harbour will be perceived: it is formed by the Sugar-Loaf to the westward, and Santa Cruz point to the eastward, on which is a fort. Having the Sugar-Loaf open to the westward of Paya, steer direct for it; and if the wind be not likely to carry you fairly into the harbour, anchor in 10 or 12 fathoms, when you are within $\frac{1}{2}$ or $\frac{3}{4}$ of a mile of a small isle, lying just without the Sugar-Loaf, called Catunduba or Toucinhos, with it bearing about N.W. If you go farther in, the swell on the bar will

* The Nereus frigate passed between them, and Capt. Heywood observes, that there are good passages between all the islands which lie off the entrance of Rio Janeiro harbour.

make you roll your ports in the water; and it is imprudent to anchor between the Sugar-Loaf and Santa Cruz, in the narrow part of the entrance to the harbour, where the depth is greater, the bottom rocky, the channel not a mile wide; and with the tide rushing through it, between the rocky shores on each side, at the rate of 6 or 7 miles an hour on the springs.

The sea breeze usually sets in before mid-day in the entrance of the harbour, and continues till about sun-set. Do not enter between the Sugar-Loaf and Santa Cruz point with an ebb tide, and the sea breeze far expended, for several ships, at different times, have been nearly lost, by anchoring in the gut between them.*

If you do not get a pilot outside, keep nearer Santa Cruz point than the Sugar-Loaf, in passing between them. There is a fort called St. Joaõ, a little above the Sugar-Loaf; this and Santa Cruz Fort on the opposite side command the entrance of the harbour. When past the latter, the course up the harbour is about N. by W. ½ W., leaving the little isle of Lagea to the westward. You may then stand boldly on for the anchorage abreast the city, if there is a moderate commanding breeze; and you cannot have a more convenient berth for watering, &c. than with the principal church in one with the small Isle Ratos, or Rat Island, S. 53° W. by compass, and the flag on Villegagnon Fort on with the Sugar-Loaf S. 8° E., where you will be abreast the watering place, in 17 fathoms mud and sand. Isle Cobras lies before the city, and some ships pass round the north part of it, and anchor before the monastery at the N.W. end of the city.

If the breeze is light and flattering, as soon as you pass Santa Cruz point, haul up to the eastward; for should you be obliged to anchor short, the ground is good on this side. The inner harbour lies within the islands Cobras and Enchadas. On the N.W. side of the former, there is a convenient place to heave down ships of any size.

Rio Janeiro Harbour is easy of access, readily known by the remarkable land about it, and is very commodious. You should moor as soon as possible, the tides being much influenced by the winds, and the latter so variable, that it is difficult to keep a clear anchor 24 hours: it is high water at 4½ hours full and change of the moon,† the ebb then running much longer than the flood, and the velocity 3½ or 4 miles per hour.

Tides.

Rio Janeiro City, called also San Sebastiaõ, is the capital of Brazil, formerly the residence of a viceroy, now of an emperor. The water is conveyed in pipes to the jetty, where boats lie and fill their casks with ease, as the rise and fall of the tides are inconsiderable. Hogs and poultry are dear, and the beef of inferior quality; but plenty of excellent fruit, yams, pumpkins, and other vegetables, are easily obtained, which are very useful for a scorbutic ship's company, as the yams and pumpkins will keep a long time at sea.

Directions for departing.

When bound out, if the wind is steady, steer direct for Santa Cruz point, but edge over to the eastward as soon as you can if it is light, till Santa Cruz bears about S.S.E. ½ E. If obliged to anchor, go no farther out, than to bring Villegagnon flag-staff on

* September 16th, 1803, H.M. ships Sceptre and Grampus, with the outward-bound fleet for India, steered in for the harbour in the afternoon. At 7 P.M. it became squally and dark, with thunder, lightning, and rain; the shore was discernible only by the flashes of lightning. The journal of the Essex states, that they anchored at 8 P.M. near the Sugar-Loaf, and nearly drove on shore with two anchors down. The Earl Spencer also anchored at 8 P.M. in 19 fathoms, with the best bower, and soon perceived they were near the Sugar-Loaf, which obliged them to let go the small bower and sheet, to prevent being driven on shore. The ebb tide was setting round the point to the southward, near 7 miles an hour. This ship's journal mentions, that all the fleet were in danger in different ways, and that a flash of lightning saved the Sceptre from running on shore on Santa Cruz point.

† The accounts of the time of high water differ considerably; it therefore appears to be uncertain. Capt. Fitz-Roy gives 2h., and Purdy, in his Sailing Directions, 2h. 30m. at the full and change of the moon.

with the peak at the back of the town, bearing about W. by S. $\frac{3}{4}$ S., and Lagea or Square Island Fort on with the West end of Catunduba Island, where you will have 15 fathoms mud and sand:—this anchorage is about midway betwixt Villegagnon Fort and the eastern shore. Farther out, the ground is foul and rocky. There is a small perpendicular islet, with a church and house on its summit, elevated about 100 yards from the sea, having its communication with the main by a bridge; on the top of this islet, there is a well of excellent water, the water not more than 20 feet from the surface.

The advantage of keeping to the eastward is, that if you weigh in the morning with the land breeze, at first generally very light, you are in the fair way of the tide, which will set you right out; but if more to the westward, it would be liable to horse you upon Square Island, which consists of some rocks with a fort on them. The bar is about $\frac{1}{2}$ or $\frac{1}{4}$ mile without Santa Cruz point; the least water on it is thought to be $6\frac{1}{2}$ or $\frac{1}{4}$ less 7 fathoms at low water spring tides. It is about $\frac{1}{2}$ a mile in breadth, the depth increasing gradually on each side. The Sugar-Loaf is about 62 miles west from Cape Frio.

Rat Island, in Rio Janeiro Harbour, is in lat. 22° 54′ S., lon. 43° 1′ W., by the observations of Captain Heywood, General Brisbane, and M. Rumker. By an eclipse of the sun, recorded in the Brazilian Gazette, it is said to be lon. 43° $3\frac{1}{2}$′ W. Allowing Funchal to be in lon. 16° 54′ 31″ W., Capt. King made Rat Island in lon. 43° 5′ 32″ W., and Capt. Foster in his scientific voyage, allowing Funchal the same, made Rat Island in lon. 43° 4′ 21″ W. by the series of excellent chronometers furnished by government. Position.

Capt. Beechey, in 1825, made Gloria Observatory in lat. 22° 55′ 11″ S. by mean of 19 meridian altitudes of stars, corrected for aberration; and in lat. 22° 55′ 14″ S. by mean of 5 meridian altitudes of the sun. He made the lon. 43° 12′ 38″·9 W. by observations of right ascension of the moon. 43° 12′ 46″ W. by mean of 113 lunar distances East and West. 43° 15′ 10″ W. by chronometers, from Santa Cruz; and he made Cape Frio 1° 15′ 2″ E. of Gloria Observatory. Capt. Owen in his survey of 1822, made Raza Island Lighthouse in lat. 23° $3\frac{1}{2}$′ S., lon. 43° 15′ W., and the Sugar Loaf in lat. 22° 56′ S., lon. 43° 15′ W. nearly. Capt. Fitz-Roy makes Villegagnon Island in lat. 22° 54′ 40″ S. and in lon. 43° 8′ 4″·5 W.*

Rio Janeiro, affording abundance of refreshments, is frequented by ships of war, and others bound to India with troops on board, for obtaining needful supplies; but unless they are in want of water or refreshments, or otherwise obliged to run for a port, it seems not advisable for ships destined to India, to touch at any of the ports on the coast of Brazil, as it must considerably lengthen the passage. Should a squadron of ships be absolutely necessitated to stop somewhere, it may, however, be preferable to go into Rio Janeiro, rather than into False Bay at the Cape of Good Hope during the winter season, where supplies are not so abundant, nor the anchorage so safe for a fleet or large squadron.

ILHA GRANDE, Point Castelhanos, its eastern point, is in lat. 23° 12′ S., lon. 44° 0′ W., and the island is about 6 leagues in length, the eastern channel into its harbour being about 16 leagues to the W.S.W. of Rio Janeiro entrance. The whole of the channel formed between Ilha Grande and the main, is a spacious and safe harbour for ships of any number and size, with soundings from 6 to 15 fathoms. There is fresh Ilha Grande.

* These unaccountable differences between skilful navigators and astronomers, furnished with excellent chronometers and superior instruments for ensuring accuracy, are very perplexing to hydrographers.

water on the west end of the Island Maranbaya, which bounds the east side of the eastern channel, and wood may be got on the contiguous islands; refreshments may also be got at the village on the main, opposite to the middle of Ilha Grande.

San Sebastiaō Island.

SAN SEBASTIAO ISLAND. The S.E. point is in lat 23° 56′ S., lon. 45° 20′ W., and Villa Nova Fort in lat. 23° 47′ S., lon. 45° 27′ W., by the French survey, and it lies about 19 leagues to the S. W. of Ilha Grande; a safe harbour is formed between it and the main, by entering from the northward and keeping near the island, as the main land is lined by a shoal bank. Refreshments may be got at the villages on the island, or at those on the continent. The South entrance is not above a mile wide, but with proper caution, may be navigated in a middling sized ship, as Captain Heywood, in the Nereus Frigate, in 1810, passed between the Island San Sebastiaō and the main, where he lay 2 days during a S. E. gale, surveying the channel. He also passed between Ilha Grande and the main land.

There are several groups of small islands in the neighbourhood of San Sebastiaō: the Porcos Isles to N. E. near the main, with a passage inside them; the Busios 5 leagues to the eastward of its north point; Vittoria Island about 2 leagues W. S. W. of the Busios and nearly midway between those isles and San Sebastiaō; Monton de Trigo Island, off the coast 6 leagues, to the westward, and the Alcatrasses hereafter mentioned. There is also a rock reported to have been seen by a Bahia pilot, 35 leagues S. by E. ½ E. of San Sebastiaō in lat. 25° 41′ S., lon. 44° 48′ W.

Santos.

SANTOS BAY, (Ilha Moela), in lat. 24° 2′ S., lon. 46° 23′ W., about 15 leagues to the W. S. W. of San Sebastiaō, affords safe anchorage from all winds, except those at S. E. and southward; the town is 4 or 5 miles up the river. In this track, 5 or 6 leagues S. W. from the Island San Sebastiaō, lie the Alcatrasses Isles, or Barre Rocks, in lat. 24° 6′ S., lon. 45° 47′ W., having foul ground about them. Lage de Santos, in lat. 24° 18′ S., is about 6 feet above water, distant about 6½ leagues S. S. E. ½ E. from the entrance of the port of Santos. In mid-channel between it and the land the depths are 19 and 20 fathoms sand and ooze.

Alcatrasses.

Redonda Isle.

Redonda, or Round Isle,* called also Queimada Grande, in lat. 24° 30′ S., lon. 46° 47′ W., and about 6 or 7 leagues off shore, has a reef a little inside of it, extending about 4 miles parallel to the coast; to avoid which, ships happening to get to the westward of Redonda ought to keep it bearing to the northward of E. by N., for with it bearing E. ½ N. a ship will be within ½ a mile of the reef.

From Redonda Isle, to Sta. Catherina, there are several small islands near the coast, which is safe to approach, having in this space some harbours, the best of which is that of St. Francisco, in lat. 26° 6′ S., and Garoupas Road, in about lat. 27° 5′ S.

Island Sta. Catherina.

ISLAND STA. CATHERINA extends about 10 leagues N. by E. and S. by W. the North end being in lat. 27° 23′ S., lon. 48° 32′ W., by the French survey of Roussin, but it was formerly thought to be more to the eastward. The channel between this island and the main forms an excellent harbour for ships of every description; and it is navigable to the narrow strait near the middle of the island, a little beyond which stands the town of Sta. Catherina. From hence, to the South end of the island, the channel will only admit small vessels out to sea.

Directions.

The proper passage into the harbour is round the North end of the island, between

* The name Redonda, or Round Island, is said to be improperly given to this island, which is described as long and flat; but belongs properly to the smaller Queimada, which is ten miles nearer the main.

it and the Isle Alvoreda, distant about two leagues to the northward; but a ship may pass occasionally betwixt this isle and the other small isles to the N.W. of it, or between the latter and the main, if necessary, the depths being from 8 to 12 fathoms among those isles. Having rounded the North end of the island, steer to the S.W. and southward, keeping about mid-channel between Sta. Catherina and the main, and anchor under the small Isle Anhatomerim, situated near the latter.

The Flag-staff of the Fort on Anhatomerim by Baron Roussin is in lat. 27° 25′ 32″ S. and lon. 48° 40′ 52″ W. By Capt. Foster, in H.M.S. Chanticleer, in lat. 27° 25′ 29″ S., lon. 48° 28′ 30″ W., by mean of 17 chronometers. Capt. Fitz-Roy, who confirms the Baron's latitude, makes the lon. 48° 34′ 45″ W. Variation 6° 30′ E. (1832).

Ships are well supplied with fruits, vegetables, and refreshments of various kinds at this place, but the prices are rather high. Several small isles line the shores of Sta. Catherina on both sides, those off the South end extending about 3 leagues to seaward; and the soundings increase to 65 or 70 fathoms about 10 leagues east of Sta. Catherina.

Although neither the Spanish nor Portuguese charts mark any soundings between Rio Janeiro and Rio de la Plata, yet every part of this coast seems to be fronted by soundings, stretching a considerable distance off shore. Coast to Rio de la Plata.

From the Island Sta. Catherina to Morro Sta. Marta, the coast extends about 20 leagues S.S.W.; thence to Cape St. Mary, at the entrance of Rio de la Plata; the direction of the coast is generally about S.W., and in this space it has no safe harbours for large ships, but the shore in most places may be approached to a moderate distance with safety.

## WINDS AND CURRENTS.

It has been observed, that on the Brazil coast the winds are periodical, blowing from S.S.E. and S.E. from March to September, the current then running to the northward; and from September to March, the wind blowing from N.E. and E.N.E. with a southerly current prevailing during the same period: vessels are therefore directed to make the land to windward of the port they intend to touch at, according to the direction of the periodical winds blowing along the coast, which generally govern the currents. Periodical winds and currents on Brazil coast.

When the sun is in the northern hemisphere, the winds on the Brazil coast certainly incline more to the south-eastward than in the opposite season, when that luminary is South of the equator, for at this time they prevail from the eastward.

It appears that in any season of the year, if the coast be not made to the North of Cape St. Augustine, there is no difficulty in getting to the southward; for ships which have made the coast in lat. 7° and 8° S., which is considerably to the northward of this cape, even in the unfavourable season, found little difficulty in getting to the southward after making a few tacks, and experienced little or no current to the northward. But from March to October, in an indifferently sailing ship, it would be imprudent to make the land to the north of Cape St. Augustine, if it can be avoided. To the northward of Cape Ledo or near Cape St. Roque, it certainly should not be made, on account of S.E. winds; and W.N.W. currents are liable to sweep a ship round Cape St. Roque to the westward, which has frequently occurred.* Of making the land.

* The transports with the ordnance stores on board, for the army of Monte Video, in 1807, by crossing the equator too far to the westward, were carried so far in this direction by the currents, that they could not get to the southward of Cape St. Augustine, and were twice obliged to stand to the northward, into variable winds

Outward-bound ships touching at St. Salvador in any month of the year, may, after leaving it, proceed to the southward without difficulty; for the winds mostly draw to E.S.E. in lat. 13° or 14° S., even in the most unfavourable season, and they are frequently variable near the coast, with land breezes at times. About Cape Frio, the prevailing winds are north-easterly all the year, though often variable. Sea and land breezes are usually experienced in the entrance to Rio Janeiro.

The experience of the following ships may be useful in determining the best mode of making the passage:—

## PASSAGES OF SHIPS.

Crossing the Equator in lon. 30° W.

THE KING GEORGE, 1st June 1792, crossed the equator in lon. 30° W. with the view of getting quickly into the S.E. trade, but being in the stream of the *equatorial current*, she was carried greatly to the westward, and saw the land about Cape Roque at 5 P.M., 6th June, bearing from S.S.E. to S.W. by S.; having steered South 4½ miles till 6 P.M. she tacked to the N.E., Cape Roque bearing S.S.E., a remarkable hummock South, breakers on Cape Roque shoal S. by W., distant 3 or 4 miles, and off the land 8 or 9 leagues. She stood from hence, close hauled to regain the variable winds in North latitude, in order to make easting, which considerably prolonged her passage to India.

Crossing the Equator in lon. 35° W.

THE ACTIVE, bound to Pernambuco, passed Cape de Verde Islands in lon. 31½° W., and on the 4th March 1811, she crossed the equator in lon. 35° W., and afterwards made the coast of Brazil far to the West of Cape Roque. March 25th, a pilot came off, and carried her into Parrazira Bay, where she procured another pilot to conduct her to Pernambuco. Coasting along to the eastward, with land breezes at times, the boat was daily sent on shore for provisions, and she anchored in the night, or when the wind was contrary, as the tide or current ran mostly to the westward.

Salinas Bank.

Salinas Bank was found to extend parallel to the coast a great way* to the westward of Cape Roque, being a steep coral reef above and under water, with a channel of 1 to 2 miles broad between it and the shore: here the pilot got the Active once aground, and at another time into 2½ fathoms. By crossing the equator too far West, and consequently getting far to leeward of Cape Roque, this ship's passage was so much prolonged, as to render her voyage unprofitable, which occasioned a suit at law between the freighters and proprietors of the ship.

Route past Fernando Noronha.

THE GENERAL STUART, August 19th, 1803, lost N.E. trade in lat. 14° N., lon. 27° W.; was then perplexed with light breezes from S. to S.S.W. and stood to the S.E. On the 31st, in lat. 6° N., lon. 15° W., stood to the westward till in lat. 1° N., lon. 27° W. September 10th, the wind then veering to S.S.E. saw Fernando Noronha, and anchored there on the 15th. The well being nearly dry, and a high surf, procured only 9 butts of water at this place; sailed 19th, and made the Brazil coast on the 20th, in lat. 7° 10′ S.; on the 21st and 22nd, the wind at S.S.E. to S.E., tacked several times at 5 or 6 miles from the shore; at noon 22d, in lat. 7° 48′ S., the wind veered to E.S.E. and E. by S., stood to the southward, and saw the coast no more.

to regain easting, after having made two fruitless attempts to get into the regular S.E. trade. This happened in May and June.

* The Brazil pilot says 30 leagues, in a N.W. direction.

THE WARREN HASTINGS, May 5th, 1803, lost north-east trade in lat. 9° 30′ N., lon. 23° 40′ W. and got S. E. trade 21st, in lat. 2° N., lon. 25° W. The trade being scant, made the Brazil coast 28th, in lat. 8° 30′ S.; on the 29th, the wind veering more easterly, lost sight of the coast in lat. 9° S. Whilst in sight of the land, had soundings from 25 to 40 fathoms.

Brazil Coast, made near Cape St. Augustine.

THE TELLICHERRY, May 10th, 1802, lost north-east trade in lat. 7° N., lon. 25° W., and got S.E. trade 14th, in lat. 3° N., lon. 27° W.; had the trade far southerly, and saw Fernando Noronha 20th; tacked to north-eastward for 30 hours; saw the island again 22d, and passed to leeward of it; saw the Brazil coast 24th, and was obliged to tack frequently near it for several days, the wind south-easterly; in lat. 8° 6′ S. on the 30th, with a steady wind at S.E. and S.E. by E., was enabled to stand to the southward without tacking again.

1802. Route near Fernando Noronha.

THE CUFFNELLS, May 28th, 1802, lost north-east trade in lat. 8½° N., lon. 22° W., and got S.E. trade June 4th, in lat. 5° N., lon. 21° W. From the equator, had a current setting W., and W. by N. from 30 to 52 miles daily, till the coast of Brazil was in sight 14th, in lat. 8° S.; tacked to the N.E. and stood on this tack near two days, then tacked to the southward, and saw the land no more.

Brazil Coast, made near Olinda.

THE SIR EDWARD HUGHES, May 23d, 1802, lost north-east trade in lat. 6° N., lon. 23° W., and got the wind at S.S.E. 25th, in lat. 5° N., lon. 23° 30′ W. The trade kept far South, and the current set westward strong. June 2d, saw Fernando Noronha, made several tacks till the Brazil coast was seen about Cape St. Augustine, June 7th; had some hard squalls here. In lat. 13° S. the wind veered to E.S.E. and to E. by N., June 13th, in 17° S. latitude.

1802. Route near Fernando Noronha and Cape St. Augustine.

THE HENRY DUNDAS, October 20th, 1797, lost north-east trade in sight of Cape de Verde Islands, and crossed the equator November 4th, in lon. 30° 30′ W., with a scant S.E. trade. On the 8th, made the Brazil coast in 6° 50′ S. about Cape Ledo. The wind became more favourable near the land.

1797. Equator crossed in lon. 30° 30′ W. and coast made near Cape Ledo.

THE BOMBAY CASTLE and fleet, June 27th, 1795, at 3 A.M. in about lat. 7° S., had 18 fathoms on the Brazil coast, and tacked; the wind continued from south-eastward, with very little current, till she arrived at St. Salvador, July 7th. They had 6½° westerly current from Palma, Canary Islands, to the coast of Brazil.

Route from Palma to St. Salvador.

THE EUROPE and fleet, October 16th, 1805, lost north-east trade in lat. 11° N., lon. 28° W., and got south-east trade 26th, in lat. 4° N., lon. 29° W. November 4th, in lat. 6° S. saw the Brazil coast; had the wind near the land at E. by S., and E.S.E., stood to the southward along the coast; on the 7th, were in 18 and 19 fathoms off Pernambuco Point: on the 8th, in lat. 10° 40′ S. the wind veered from E. by S. to E. by N. and E.N.E., no land in sight; worked into the Bay of All Saints on the 10th, the wind at E. and E. by S.

By crossing the equator too far West, the Company's ship Britannia, and King George transport, were wrecked on the Roccas Shoal in the morning of the 1st November, and several other ships in the fleet narrowly escaped this dangerous shoal.

Two ships wrecked by going far westward.

# INSTRUCTIONS AND OBSERVATIONS FOR NAVIGATING THE RIO DE LA PLATA, OR RIVER PLATE.

BY CAPTAIN HEYWOOD, OF THE ROYAL NAVY.

Winds.

AT RIO DE LA PLATA ENTRANCE, the prevailing winds during the summer months, from September to March, are north-easterly, with tolerably clear weather over head, but a dense atmosphere near the horizon. These winds veer gradually to the eastward as you advance up the river: and about the full and change of the moon, strong breezes from south-eastward are common at this season, accompanied with rain and foul weather. At Buenos Ayres, during the summer months, the S.E. winds are generally fresh in the day-time, veering round to northward in the night.

During the winter months from March to September, the prevailing winds at the entrance of the Plata are S.W., or more westerly; but up the river, more generally from the northward than the southward of West.

In the winter is the best weather at Buenos Ayres, for the winds being chiefly from N.W. to S.W., the water is smooth and the communication can be kept up between the shore and the shipping with more facility. The weather is sometimes foggy, but fogs are most common in the months of July, August, and September, prevailing more at the entrance of the river, and as far up as the S.E. tail of the Ortiz, than above these banks.

Tides and currents.

As it cannot be said regular tides exist in the Plata, but currents as uncertain in their duration as they are irregular in their rate and direction, no certain allowance can be made for them; therefore, a *ground log* should be used, to find the course made good and the distance run.

The tides, when the weather is settled, and the winds moderate, seldom rise or fall more than 5 or 6 feet; though at Buenos Ayres, 8 miles distant from the city, we found in the Nereus, when the winds were strong at N.W., sometimes only 15 feet water; while with strong breezes from E.S.E. to S.S.W., the depth was upwards of 5 fathoms: but, except on such extraordinary occasions, we had between 17 and 22 feet water.*

The Plata has many singularities; which arise, perhaps, from its formation being different from any other known river. Its entrance being wide and shallow, it is affected by every change of wind in a remarkable manner; that a shift of wind may be predicted almost to a certainty, by observing carefully the state of the barometer, and the set of the currents, which usually shift before the wind. In calm weather the currents are generally very weak, setting up and down the river alternately, and nearly as regular as tides. When the winds are variable, the currents are equally so; and I have known the ship to be *current rode* four different ways in less than six hours. When the current comes in from eastward along the North bank of the Plata, a North-

* I have heard, however, of the river having been almost dried up, across from Buenos Ayres to Colonia, during heavy westerly gales.

easterly wind may generally be expected to follow, and at the same time if the wind has been previously to the S.E. the barometer will fall a little; but much more, if the transition be quick from S.W., without stopping in the south-eastern quarter.

When the wind continues in the N.E. quarter, proportionate to its strength, the mercury is more depressed than with any other wind, and then there is usually a set *into* the river on the North bank of the river, and out on the opposite bank. Indeed, whilst the winds are between N.E. and S.S.E. the current generally runs to the westward, past Monte Video, though without much augmenting the depth of water off that place, but filling the river above the banks.

Winds between N.N.E. and W.N.W. make the water lowest; the *out-set* being then strongest along the South bank of the river, past the Points del Indio and Memoria; but very inconsiderable along the North bank.

Prior to a S.W. gale, or Pampero, the weather is usually very unsettled, with unsteady and variable winds in the North and N.W. quarters; preceded by a considerable fall of the mercury, though it usually rises a little again before the wind shifts to the S.W., and often continues to rise, even though the wind may increase from that quarter. Before these set in at Buenos Ayres, the current runs up and fills the river unusually high; at the same time, as strong an out-set is experienced along the North bank, which continues whilst the winds are strongest from W.S.W. to South, seeming to prove, that these winds force up from the southward a large accumulated body of water past Cape St. Antonio, which can only find a passage out again by the North shore, where they increase the depth of water, as well as up the river, and particularly in the shallow harbour of Monte Video. Whilst these S.W. winds blow, the air is cold, and the atmosphere clear and elastic, in a degree rarely to be met with in any other part of the world. They are generally succeeded by some days of fine serene weather; the wind continuing moderate from the southward, or varying to the eastward.

I have never known the velocity of the tide or current in any part of the river to exceed 3 knots per hour; although it is reported sometimes to have run 6 to 7 miles an hour.

As the winds outside the river, and particularly about Cape St. Mary, are most frequently from the north-eastward and northward, except when the S.E. summer, and S.W. winter gales blow, about the times of new and full moon, I consider it most advisable for ships bound into the river, to get in with the land about the latitude of that cape, which is 34° 40′ S., and its lon. 53° 54′ W. of Greenwich, or 2° 9′ E. of Mount Video.* Cape St. Mary.

In lat. 33° S. the bank of Soundings extends off the land full 36 leagues, where the depth of water in lon. 50° 20′ W. is 94 fathoms, and the quality of the bottom dark olive-coloured mud, or ooze, as it is all along the outer verge of the bank. In lat. 34° S. and 30 leagues from the land, the bank is steep; and the soundings decrease quickly in standing to the westward, to 25 fathoms 20 leagues from the land. Bank of soundings.

In lat. 34° 20′ S., lon. 51° 50′ W., or about 30 leagues East of the Great Castellos Rock, the depth is 63 or 64 fathoms dark mud. In standing for the land, between the Great Castellos and Cape St. Mary, the water shoals in a short distance from 60 to 25 fathoms; and the quality of the bottom changes to sand, which grows coarser as you approach the coast; and, as far as 7 miles off shore, is intermixed with shells. This bottom is found only in and to the northward of the latitude of Cape St. Mary, except very close in with this cape.

* M. Barral, Capitaine de Corvette, who surveyed the Rio de la Plata in 1830-32, makes Cape St. Mary in lat. 34° 39′ 1″ N., lon. 54° 9′ 38″ W. of Greenwich, and 2° 3′ 25″ E. of Monte Video Cathedral. Var. 11° 7′ E.

To the southward of 34° 40′ S. the bottom is chiefly mud, intermixed with fine sand or gravel; and if a ship happen to be set to the southward of Cape St. Mary, as she hauls in for the land, yet keeps to the northward of Isle Lobos, she will get out of fine sand into dark mud ; which is the quality of the bottom (chiefly) between Cape St. Mary and Lobos, as well as 8 or 9 leagues to the eastward of that island ; and the depth of water between them is generally 26 to 20 fathoms.

In lat. 35° S., lon. 52° W., or 42 leagues *true* East of Lobos, there is about 90 fathoms water, dark sandy bottom ; from thence the bank of soundings takes a S.W. direction. East of Lobos 27 leagues, the depth is 25 fathoms ; and in steering in, on its parallel, the same depth nearly continues till close to that island. But if set a little to the southward of Lobos, the water will shoal probably to 10 fathoms on a hard sandy or gravelly ridge that extends all the way from the English bank, in its parallel as far as lon. 52° 30′ W., or full 18 leagues to the eastward of the meridian of Lobos.

Thus, the approach to this river cannot be considered dangerous, if proper care be taken in navigating, and due attention paid to the lead and the course steered.

Captain Bouverie gives the following remarks :—

Cape St. Mary.

" CAPE ST. MARY is a low point, fronted by rocks, and the direction of the coast to the westward of this cape, becomes more westerly than at any other part northward of it. About 6 miles North of it there is a house, with a row of trees northward of the house, probably a fence of high prickly pear-bushes, which is very remarkable.

" About a mile South of the house, there is a bluff point, with a few rocks at the foot, which is remarkable, being different from the rest of the coast, the general character of which is a sandy beach. You cannot fail knowing the cape by these marks, when running down the coast near it : but at a considerable distance off you will not perceive them.*

" To the northward of the cape, between it and Palma, there are 10 or 11 fathoms at a little distance from the shore.

" Ships generally make the land with N. or N.E. winds, therefore it is best to keep in the latitude of the cape or a little to the northward of it, till you get soundings, as the currents set to the S.W., but do not make the land North of the cape, for although there seems no real danger, yet the water in many places is shoal a long way off the land, and would alarm strangers.

" In lat. 33° 27′ S., lon. 52° 9′ W., there is a shoal where we found 9 fathoms water ; which is probably a ridge, running in that parallel of latitude all the way to the shore. In lat. 34° S. is some tolerably high land, with a Spanish fortress on it, called Fort Teresa; it is square, with bastions at the angles, and stands about a mile from the beach. About 6 leagues N.N.E. from it, a mark is set up, as the termination of the Spanish territories. Being in the lat. of Cape St. Mary, and having got ground in 28 or 30 fathoms water, fine sand and shells, you may reckon yourself 20 leagues off shore ; with from 15 to 20 fathoms, sand and clay mixed, you are not far off the land. When you have not seen the land before night, be sure to keep to the northward of the cape by your reckoning, as the current sets to the southward, with North and N.E. winds : with South and S.W. winds, it runs strong the other way."

Agreeing with Captain Bouverie, that it is generally advisable to make the land about Cape St. Mary, I would recommend, if the wind be between S.E. and N.N.E.,

* The Nereus tacked in 12½ fathoms water, the prickly pear-hedge, on with Cape St. Mary, bearing North by compass, the breakers stretching to the S.E. of the Cape N. 7° E., and her distance from the cape about 3 miles.

to enter the river on the North side of the English Bank, passing Lobos on either side, according to the wind and state of the weather. There is a good passage between Lobos and the main, having 14 fathoms water.

LOBOS ISLAND, is in lat. 35° 1′ S., lon. 54° 39′ W., or 1° 24′ East of the Mount Video.* It bears about true S.W. from Cape St. Mary, distance 41 miles. Variation off it, 13° easterly, in 1813. Lobos Island.

When within 3 or 4 leagues of Cape St. Mary, in 17 or 18 fathoms, S.S.W. by compass, is a fair course to steer for passing *outside* of Lobos in the night; because with the wind from N.E. or eastward, the set along shore into the river must be guarded against. Steering this S.S.W. course, the depth of water will increase to 20 and 22; and in some casts, perhaps, to 25 or 27 fathoms, if you are set neither to the westward nor to the southward of it; and the bottom will change, first to sandy mud, then to dark blue mud, as you approach the lat. of Lobos. If set to the southward, in steering S.S.W. you will not deepen so much; the bottom will keep sandy; and when you approach the lat. of Lobos, you will have no more than 19, 18, and 17 fathoms; but if you are set to the southward of Lobos a few miles, you will have hard casts of from 16 to 10 fathoms, and may rest assured of being on the parallel of the English Bank, and may therefore make a west-northerly course *true*, till you find the bottom soften; as it is all dark-blue or greenish mud in the channel between the foul ridge of the English Bank, and the north shore, all the way up to Monte Video, in the fair way from Lobos. When off Lobos, if the weather threaten, and likely to blow, you will find safe anchorage in the harbour of Maldonado, sheltered from southerly winds by the island of Goritti, which bears N. 42° W. true, 11 or 12 miles from Lobos.† Directions. Maldonado.

"Capt. Bouverie observes, that the Spanish surveys of this bay, mark sufficient depth of water for any ship between any part of the island and the main: however, it cannot be safely entered but by small vessels, except to the westward; and you must not go farther in, than to bring the N.W. point of Goritti to bear S.S.W. ½ W., or S.W. by S. by compass, with 4½ or 5 fathoms stiff clay. With southerly winds, there is in the East passage a heavy swell; and the water, from the ground being uneven, breaks almost the whole way across in bad weather. The Diomede, 50-gun ship, passed through it to the anchorage before its dangers were known, and had not less than 18 feet; but there are places with only 1½ fathoms, very irregular soundings. There is a bed of rocks to the South of Goritti, from which the Tower of Maldonado bears North, and the outer part of Point del Este E.N.E. ½ E."

"In the direct line of the entrance of the bay from the westward, lies a bed of rocks, having only 3, and 2¾ fathoms on some of the patches; from which the N.E. point of Goritti bears E. ½ S. N.W. point of ditto, E. by S. ½ S. S.W. point of ditto, S.E. by S. Point Ballena bears W. by N. ½ N., and the hill of Pan de Azucar, just within the extreme of Point Ballena."

"In mid-channel between these rocks and the island, there are 6 and 7 fathoms; and their distance from the island is about ¾ of a mile: there are 7 fathoms close to them, all round the western side. The watering place is on the main, close by a battery; and the stream loses itself in the sand, except when swollen by heavy rains; you have to roll the casks about 60 yards over the sand, and the water is very good." Watering place.

Having Lobos bearing N. by W. by compass, distant 3 or 4 miles, you will have Directions.

* By M. Barral, its longitude is 54° 54′ W. of Greenwich, and 1° 21′ E. of Monte Video Cathedral.

† The distance is only between 6 and 7 miles by M. Barral's chart.

about 18 fathoms; and in making a compass course W. $\frac{1}{2}$ S. by ground log, having due regard to the wind and current at the time, you will make the island of Flores a-head. In this track the soundings will gradually decrease from 18 to 12 fathoms due South of Black Point, and to 7 or 8 fathoms when you approach within 9 or 10 miles of Flores.

Though Captain Bouverie says, "you may run quite up to Monte Video, either by night or day, by making a due West course, first trying the current to make allowance for it;" and though I have frequently done it myself, yet I would not recommend it as a general rule to be followed by strangers. Great care and attention to the course made good, and to the soundings, are indispensably requisite to those who attempt to conduct vessels during the night, in any part of this river; and even these have often been insufficient to save ships from destruction.

Flores Island. FLORES, bears *true* W. 4° 30′ N. from Lobos, distant 52 miles; it extends nearly N.E. and S.W., having a small hummock in the middle, and one at each end, that to the S.W. being 39 feet high. Between these the land is low and marshy, and overflowed sometimes between the central and N.E. hummock. It may be seen at the distance of 5 or 6 leagues from a ship's deck, in clear weather.*

There is good anchorage all round this island; but a reef extends in a N.W. direction from the north point about a mile. Seals and sea-lions, also various aquatic birds, resort to this small island as well as to Lobos; and, in the months of August and September, great quantities of very excellent eggs may be procured. With the wind easterly, boats may land on the western side of Flores, particularly in a small cove

Caretas Rocks. very near the S.W. part of the island. From Flores, W.N.W., the Caretas Rocks, seen above water, are distant about 5 miles, and there are 5 fathoms between them.

English Bank. True South, at the distance of 11 miles from Flores, lies the North part of the English Bank, having on it in that lat. 35° 8′ S., about 12 feet water: the depth of water between Flores and the English Bank, is 7 fathoms all the way across, to within a very little distance of both. The English Bank, in lat. 35° 12′ S. generally has breakers; and, with a low river, is above water in some places. Its extent to the southward has not yet been accurately defined, and for 70 or 80 miles to the south-eastward of it, the ground is said to be foul and uneven, and has not been explored.

Between the Archimedes Bank, and the English Bank, there is a swatch, about 5 miles wide, with 5 fathoms water, according to Capt. Beaufort of the Royal Navy, who explored these banks in 1807.

Archimedes Bank. ARCHIMEDES BANK, the shoalest part with $2\frac{3}{4}$ fathoms, is 4 miles in extent about North and South by compass; and has 4 fathoms all round. The centre of it is in lat. 35° 12′ S., and Monte Video bears *true* N. 22° W. from it, distant 20 miles. Besides this bank, there is a small knoll in lat. 35° 14′ S., which bears true South from Monte Video, 21 miles, with not more than $3\frac{1}{2}$ fathoms water on it, and about 4 fathoms all round. Passing to the southward of Flores, at the distance of 2 miles, you have $6\frac{1}{2}$ or 7 fathoms, and may steer W. $\frac{1}{2}$ S. by compass to pass Point Braba, which bears *true* W. 4° N., distant 4 leagues from the S.W. end of Flores. This point is bolder to, than the land to the westward between it and the town of Monte Video, and may be passed close, in $4\frac{1}{2}$ or 5 fathoms, at 1 mile or $1\frac{1}{2}$ miles distance. The best anchorage for a frigate off the town of Monte Video, is with Point Braba bearing by

* Since 1826 there has been a revolving light on the S.W. part of the island, the height of which above the sea is, according to Purdy, 99 feet.

compass E. by N. ½ N., the cathedral N.E. by N., and the Mount about N.W. by N., in 3½ or 4 fathoms, 2 miles or more from the town, with the harbour quite open. The bottom is all soft mud.

MONTE VIDEO HARBOUR is very shoal, having only from 14 to 19 feet water; but the bottom being very soft, vessels receive no damage by grounding. Capt. Bouverie says, "the wind at S.S.W. blows right into the harbour, causing a good deal of sea, and occasions the water to rise a fathom or more. Monte Video.

"In a long continuance of fine weather, the tides sometimes, though not often, assume the appearance of regularity. They are governed entirely by the winds, and southerly winds cause the water to run out on the North shore strongest: fine weather and a N.W. wind, make the water lowest. It is usual in Monte Video harbour, to have an anchor to the S.E., and another to the S.W., and to take one cable in abaft from the northward; for the water forced in by the southerly wind, sometimes rushes out with astonishing rapidity; when the anchor to the north is of the greatest service." The Mount is in lat. 34° 53′ S., lon. 56° 3′ W. of Greenwich;* being 1° 24′ W. of the island Lobos, and 2° 10′ E. from the cathedral of Buenos Ayres, by the observations of Captains Heywood and Beaufort of the royal navy, who surveyed this place together, and observed upon the Mount. Givry's memoir states the cathedral to be in lon. 56° 20½′ W. Captain Foster, in 1828, during his scientific voyage in H.M.S. Chanticleer, made Rat Island near the S.E. angle of the fort in lat. 34° 54′ 25″ S., by mean of 32 observations, lon. 56° 10′ 30″ W. On the summit of the mount there is a fortified building, whose base is 42 feet 6 inches by 20 feet, used sometimes for a light-house. The diameter of the lantern is 10 feet 6 inches, and its elevation above the level of the sea 450 feet. At the base of the mount there are several runs of excellent water, particularly in two small smooth sandy bays, at the S.W. part of it, where ships in the outer road may supply themselves with ease; and another on the East side of the mount, abreast of Rat Island, adapted to ships in the harbour.

Giving the preference to the passage on the North side of the English Bank, especially with the wind between S.S.E. and N.N.W. on passing Lobos, because it may be expected to shift, and probably round by the North to the westward; though perhaps not before that wind, and the in-set together might carry a ship up to Monte Video: yet, if the wind should be to the north-westward at the time of making the land, it may be expected to shift next to westward or S.W., and, therefore, a ship should not strive to beat up round Lobos in the North channel against an out-set, but stand at once over towards Cape St. Antonio, where, by the time she could stretch across, she would most likely find a S.S.W. wind and N.W. current to run up with, along a weather shore, to Buenos Ayres; or to Monte Video, if bound thither, passing to the westward of the bank of Archimedes, in about 5 fathoms water; or, if the Mount should be seen in time, it ought never to bear to the westward of North by compass, till approached within 5 leagues. Passage up by the south side of the river.

In standing to the southward from abreast of Cape St. Mary, with the wind south-westerly, a ship will have from 18 to 24 or 25 fathoms when in the latitude of Lobos and about 12 or 13 leagues to the eastward of it; and making a S.S.E. course, the water will then shoal to 18, 16, 12, or 11 fathoms in crossing the ridge, which hereabout is generally composed of grey speckled sand mixed with stones; after which the depth increases gradually to 35 or 36 fathoms, over a sandy bottom, in lat.

* Lon. 56° 16′ W. by M. Barral.

35° 40′ S., lon. 53° 25′ W. In lat. 36° S., and 15 or 20 miles farther to the eastward, you will deepen off the bank entirely. Having got as far to the southward as 36° S., you may consider yourself in the fair way for proceeding up on the South side of the English Bank, and if the wind serve, a true West course will be proper.

In lat. 36° S., the depth of water on the meridian of Cape St. Mary is 38 fathoms, the bottom fine grey sand like ground pepper. Steer to westward on this parallel of 36° S. the depth will decrease to 19 or 18 fathoms *true* South of Lobos; and for 10 leagues further, you have from this depth to 15 fathoms. But if from the lat. of 36° S. on the meridian of Lobos, you make a W. by N., or W. by N. ½ N. course *true*, you will shoal the water to 8, or 7½ fathoms in lat. 35° 45′ S., on the meridian of the English Bank. The quality of the bottom generally in this track is sandy, mixed with small stones; and the nearer you approach to the ridge of the English Bank, it is intermixed with bits of shell, and sometimes with clay or mud.

From lat. 35° 45′ S., due South of the English Bank, a W.N.W. true course to lat. 35° 33′ S. will bring the Mount Video to bear *true* North, in about 6½ fathoms mud, at the distance of 13 leagues from Point Piedras; and from this position, the same true course may be made, to raise the land about Point del Indio, if bound up to Buenos Ayres, or N.W., or more northerly, to get sight of the Mount, having regard to the set of current, up or down the river, that you may neither be horsed on the S.E. tail of the Ortiz Flats, nor on the western part of Archimedes Bank. The bottom above this is soft mud, or clay in the channels, fit for safe anchorage. In lat. 35° 30′ S., or thereabout, and due South of the Archimedes Bank, or some miles further to the eastward, I have been told by some persons they have had as little as 4 fathoms hard ground.

From Monte Video to Buenos Ayres.

Ships leaving Monte Video to proceed up to Buenos Ayres must be very attentive to the lead, and the course steered across the river must be very carefully regulated by the set of current at the time. If the weather be sufficiently clear, the Mount is the most sure guide, keeping it by an azimuth compass, on the *magnetic* bearing N.E. by N.; and when it sinks to an eye *in the top*, a more westerly course may be steered, to raise the land about Point del Indio. This direction is intended to apply particularly to frigates or any ships drawing more than 16 feet water, because it is not advisable for them to cross the tail of the Ortiz Flats much further to the westward than a true S.W. course from the Mount will take them; for with a low river, I have had barely 3¼ fathoms in the Nereus, with the Mount bearing N. 35° E. *by compass*, distant 10 leagues. At other times, I have sunk the Mount on a N. 53° E. magnetic bearing, and had as much as 3½ fathoms water; but the river was then well filled.

Ortiz Bank.

On the south-eastern part of the Ortiz Bank, which is there hard stony sand, there was in 1813, part of a mast, or beacon, about 12 or 13 feet high. It is in lat. 35° 2′ 15″ S., and 0° 45′ W. of Mount Video; from which it bears true W. 14° S. 37 miles. There is about 12 or 13 feet alongside of it, 3 fathoms 2 miles to the eastward of it, but not more than 10 or 12 feet, as far as 3 miles, S.W. of it. Point del Indio bears from it true S. 33° W. 16 or 17 miles.

To the distance of full 17 miles south-eastward of the Ortiz Beacon, there is generally no more and often less than 3½ fathoms, the bottom tough clay nearest the bank, and in some places, farther to the south-eastward, soft mud, not more than 3¼ fathoms.

After sinking the Mount about N.E. by N., and having 3½ fathoms, a W.S.W. course will raise the land about Point del Indio to the eye at the masthead, if the

weather is clear, and probably you will not have more than $3\frac{1}{4}$ or at most $3\frac{1}{2}$ fathoms. The Mount and the land near Point del Indio are sometimes visible at the same time.

Point del Indio.

POINT DEL INDIO is in lat. about 35° 16′ S., and 0° 56′ W. of Mount Video, from which it bears true S. 63° W., distant 50 miles. There is little more than 3 fathoms at the distance of 10 or 11 miles off shore, when the river is in a mean state; farther to the southward, and off Point Piedras, there is only that depth 14 or 15 miles off shore. Very great caution, therefore, is required in approaching it, and a constant look-out should be kept for the land, as it is very low, and cannot be seen farther than 12 or 13 miles from the deck of a frigate in clear weather.

When the land is barely raised to an eye 19 or 20 feet above the surface of the water, a W. N. W. magnetic course will lead along shore, between it and the South part of the Ortiz, which is distant about 14 miles from it; and between them there is nowhere more water than $3\frac{1}{2}$, but mostly $3\frac{1}{4}$ fathoms. With a high river I have had $3\frac{3}{4}$ fathoms; the nearer the Ortiz, the deeper the water.

Embudo Trees.

In steering up W. N. W. with the land seen from the deck, if clear weather, you will have $3\frac{1}{2}$ or $3\frac{1}{4}$ fathoms, yet if the river is low, perhaps some casts of three fathoms, and raise a remarkable clump of trees called Embudo, which are much taller than the rest, highest at the West end, and lie in lat. 35° 6′ S., lon. 1° 16′ 30″ West of Mount Video, or 0° 57′ 30″ East of the cathedral of Buenos Ayres. At some distance to the westward of the Embudo Trees, there is another clump about the same height, but these being highest at the East end, are sufficiently distinguished not to be mistaken for the true Embudo.

When in $3\frac{1}{2}$ or $3\frac{1}{4}$ fathoms, the Embudo Trees bearing by compass W. S. W., the S. E. end of the Chico Bank will bear W. N. W. or thereabouts, 10 or 11 miles; you must now determine, from the water your ship draws, the direction of the wind and state of the weather, whether you will pass between the Chico Bank and the shore, or between the Ortiz and the Chico. I have passed up and down several times between the Chico and the South shore in the Nereus, lightened in her draft to 18 feet 3 inches, but I would never attempt it again from choice, now I am better acquainted with the middle channel between the Chico and the Ortiz, and have every reason to believe that the Middle Ground some charts lay down in it does not exist.

A ship not drawing more than 15 feet, may take either passage, and ought perhaps to prefer that to the southward of the Chico Bank, particularly if the wind be well to the southward, as she might take her soundings from the weather shore, and, keeping in somewhat more than her own draft, run up along it; and by not deepening above 3 fathoms, would ensure being to the southward of the Chico.

Chico Bank.

The S. E. end of the Chico Bank bears from the Embudo Trees N. 32° E. *true* distant 10 miles, and E. 9° N., 13 miles from Atalaya Church. Its latitude there is 34° 56′ 30″ S., lon. 1° 9′ W. of the Mount Video. This bank runs in the direction of N. 52° W. true, or N. 65° W. by compass, about 13 miles to its N. W. end, which is in lat. 34° 48′ 50″ S., and 0° 47′ East of Buenos Ayres Cathedral. From this N. W. end in 14 feet water, Atalaya Church bears S. 14° W., distant 11 miles; and Point Stantiago, forming the Ensenada di Barragan, bears W. 4° N., distant 14 miles from it. The breadth of the Chico does not exceed 2 miles, or perhaps $1\frac{1}{2}$ miles, and its inner edge is about 9 miles from the shore. The water between it and the shore is nowhere more than $3\frac{1}{2}$ fathoms, and the deepest water is along the inner edge of the shoal, at the distance of $\frac{1}{2}$ a mile from it, or less in some places. About mid-way between it and the shore there is $2\frac{3}{4}$ fathoms. On some parts of the Chico there is very little water,

and within the limits I have assigned to it, nowhere more than 14 feet. There was for some years, the mast of a vessel, called the Pandora, which was wrecked on this shoal in lat. 34° 54′ S., about 5 miles from its S. E. end, which proved an excellent beacon to guide ships passing it on either side; but it has disappeared. It is very necessary that three buoys should be placed on this dangerous shoal, to mark its centre and each end.

Point St. Jago.

To ships drawing less than 15 feet, it is only further necessary to recommend care and attention on approaching Point St. Jago, which forms bushy and distinct; and when it is brought to bear to the south-westward, haul out into the stream of $3\frac{1}{2}$ fathoms, to round outside the Spit, which runs about N.W. by compass from Point St. Jago at least 10 or 11 miles, its extreme point, in 2 fathoms, being about 5 miles from the shore. When two remarkable trees on Point Lara are brought to bear S. by E. $\frac{1}{2}$ E., or S. S. E. by compass, you are past the Spit. This mark will also lead a ship of that draught of water clear to the westward of the Spit, in running in towards Ensenada.

After passing the Spit off Point St. Jago, in $3\frac{1}{2}$ fathoms, a W. by N. northerly course by compass will lead up to the outer road of Buenos Ayres, where any ship may safely anchor in the water she draws, if the river is low.

To sail between the Ortiz and Chico Banks.

Frigates or vessels drawing more than 16 feet water, should barely raise the land about Point del Indio to the eye on the deck, and borrow nearest the Ortiz: more particularly when the Embudo Trees are brought to bear as far as S. W. by W. magnetic; for with the Embudo bearing from S. W. to S. S. W., the bottom is flat, off to 3 fathoms, full 7 miles from the shore, and chiefly hard clay. Therefore, when the Embudo Trees bear W. S. W. by compass, and you are about 9 or 10 miles off shore in $3\frac{1}{2}$ fathoms, if you have a leading wind haul N. W. by W. or more northerly, as may be required to clear the S. E. tail of the Chico, and you will soon deepen your water to 4 fathoms and more in the middle channel, between the Chico and the Ortiz Shoals. The fair course through between them is about N. W. by W. $\frac{1}{2}$ W. *magnetic;* and in mid-channel, the land can but just be distinguished from the quarter-deck of a frigate. When the Embudo Trees bear S. 20° W. by compass, you will be abreast of the S. E. end of the Chico, and may either take your shoal soundings along its northern or outer edge, to about $3\frac{3}{4}$ fathoms, if the wind is southerly, or if the wind be northerly or easterly, borrow into a convenient depth along the southern edge of the Ortiz. I believe the breadth of this middle channel may be 5 or 6 miles, the depth of water from 4 to $5\frac{1}{2}$, and even 6 fathoms in the fair-way about the N. W. part of it, and abreast that end of the Chico. The quality of the ground all through this channel is generally soft mud, fit for safe anchorage.

The N. W. pitch of the Chico Bank being passed, and the depth of water 5 or $5\frac{1}{2}$ fathoms, steer by compass W. by N. $\frac{1}{2}$ N., or W. by N. for Buenos Ayres, taking care not to shoal under $3\frac{3}{4}$ off Ensenada till Point Lara Trees bear S. S. E. A little more than half way from Point Lara to Buenos Ayres, there are two other remarkable trees.

Anchorage at Buenos Ayres.

BUENOS AYRES,—when moored off it in the Nereus in 19 feet water, soft mud bottom, these remarkable trees bore by compass S. 17° E., the Cathedral S. 67° W., and the spire of the Recoleta Convent S. 76° W.; observed lat. 34° 34′ 30″ S., lon. by the moon, 58° 2′ W. of Greenwich, at the distance of 8 miles from the Cathedral. Variation of the compass $10\frac{1}{2}$° Easterly in 1813.

*Description of Buoys placed, in 1823, on the Chico and Ortiz Banks, Spit of Ensenada, and Bank of Point Lara, by Capt. Willis, of H. M. S. Brazen, with Sailing Directions.*

On the Chico Bank, there are four red buoys, one at S.E. extremity in 3 fathoms muddy bottom, Magdalena church bearing from it S. 15° W. by compass. One on the N.W. extremity, Point Atalaya, bearing S. 24° W. muddy bottom. The third is placed in $2\frac{1}{2}$ fathoms, W.N.W. from the one on the S.E. extremity, distant 4 miles. The fourth in $1\frac{1}{4}$ fathoms, 3 miles N. 15° West of the third.

On the Ortiz, there are four black buoys; the first, in 3 fathoms, bears N.E. from the one on the S.E. end of the Chico. The second, in 3 fathoms, bears N. $\frac{1}{4}$ E. from the one on the N.W. end of the Chico. The third, in 3 fathoms, to the N.N.E. of the one in the centre of the Chico. These, with the buoys on the Chico, form the Large Channel between the banks of 4, $5\frac{1}{2}$, and sometimes of 6 fathoms, according to the state of the river. The fourth is placed at the S.E. extremity of the Ortiz, $5\frac{1}{2}$ miles E.S.E. of the old wreck, called the Aguila Volante, Point Indio bearing S.S.W.

Point Santiago, or Ensenada Spit; a black buoy is placed on the Spit in 3 fathoms water, Point Santiago bearing from it S. 28° E., and Point Lara S. 53° W. On the Bank of Lara, or part of Ensenada Spit, a black buoy is placed in 3 fathoms, Point Lara bearing S.E. $\frac{1}{4}$ S. and Point Santiago, S. 63° E.

Departing from Monte Video for Buenos Ayres, steer S.W. 30 miles, then W.S.W. till Point Indio is seen, and when it bears S.S.W. about 8 miles distant, steer N.W. At this distance you will find $3\frac{1}{4}$ to $3\frac{1}{2}$ fathoms, deepening to $4\frac{1}{2}$ and 5 fathoms gradually; continue the same course until you get into $3\frac{1}{2}$ fathoms, then you will be near the Ortiz. Here change the course to W.N.W. until arriving at the outer roads; from 5 fathoms you may perceive the buoys. Directions.

The inside passage of the Chico being about 7 miles from Point Indio, steer W.N.W. until you see the farm-houses of the Magdalena, and when the second farm-house bears S.S.W. you will see the buoy on the S.E. end of the Chico, and by keeping on, will perceive the second 4 miles distant from the first W.N.W. on the southernmost part of the Chico; and on reaching the second, continue your course with confidence, as the bank stretches to the N.W., and the third buoy is at N.N.W. After passing Atalaya, the wood of Santiago will be seen, and after it, immediately, the point of this name; then the buoys off Ensenada. On no account ought a vessel to come within 6 miles of the land after passing Point Atalaya, for Ensenada Spit extends far out, as will be seen by the buoy, which, with a smooth river, is visible at 5 miles' distance.

The Atalaya may be easily distinguished by two small clumps of trees on the bank of the river, and some farm-houses with amber-trees. After seeing Ensenada, the amber-trees on Point Lara will be seen, which is the next point; afterwards the steeples in Buenos Ayres; then the vessels in the outer roads.

# FROM THE COAST OF BRAZIL TOWARDS THE CAPE OF GOOD HOPE.

## PASSAGE ACROSS.—ISLANDS NEAR THE ROUTE.

### PASSAGE ACROSS.

DURING most months of the year, the S.E. trade fails about the southern tropic or 2 or 3 degrees beyond it, where the wind is found to veer from eastward to N.E. and northward: the northerly winds prevail more than any other in the vicinity of the S.E. trade, from the coast of Brazil to the meridian of Greenwich, or a little farther eastward, and as far as lat. 34° or 35° S. When, therefore, a ship departs from the Brazil coast, or has got to the southward of the S.E. trade, she will most probably, in almost every month of the year, meet with brisk winds veering from N.E. to N.W., and sometimes to West and W.S.W. which will carry her quickly to the eastward. These variable winds keep mostly between N.E. and North, attended with smooth water and fine weather.* By running to the eastward in the track of these winds, gradually increasing the latitude as a ship proceeds, she will often make greater progress than by going to lat. 38° or 39° S. in search of westerly winds. Although here the westerly winds prevail during most months of the year, they are often very unsettled, completing a revolution of the horizon, with the course of the sun, every 2, 3, or 4 days, with intervening calms, particularly when the wind is from the S.W. quarter. It seems, therefore, inexpedient to increase the latitude more than 35° S. till a ship has reached the meridian of Greenwich; she may then gradually proceed into 36° or 37° S. as she approaches the Cape, for the southerly winds which prevail around the Cape land from January to April, and at times in other months, extend far to the westward. In February and March, these southerly winds are frequently experienced between the Cape and the meridian of Greenwich, on which account it is prudent for a ship bound to the Cape in this season to increase her latitude to 35° or 35½° S. when she draws into East longitude. She ought then to keep in about 35½° S. if possible, till the Cape is nearly approached, to prevent being driven to the northward of Table Bay by southerly winds.

We were to touch at Table Bay, to fill up our water in the Carron, in 1798, and crossed the meridian of Greenwich, January 18th, in lat. 34° 50′ S. The N.W. winds continued a day afterwards, placing us in lon. 2° 50′ E., then in lat. 34° 44′ S.; a calm followed, and was succeeded by a southerly wind, which continued variable between

* When cloudy weather accompanies these northerly or N.W. winds, there is risk of a sudden shift to the S.W. or South. This happened to H.M.S. Bristol, to the Queen, and to the Anna, in January 1800. We were in lat. 31° S., lon. 22° W., had run 230 miles the preceding 24 hours, and, with steering sails set, were running at the rate of 10 or 11 miles per hour, when at 9 P.M. in a shower, the wind shifted from N.W. to S.S.W. in an instant, taking us aback; we lost all the light sails and booms, and the ship's head was thrown round against the N.W. sea, before the sails were trimmed, which made her plunge bowsprit and forecastle under.

S.S.W. and S.S.E. with cloudy weather and a high sea, till we made the land on the 27th. It was at times squally, and brought us under double reefs, which, with the scant wind, forced us daily a little to the northward, although we experienced no lee current till the day we made the land at Dassen, or Coney Island; we had that day 25 miles of current to the northward. Distant 2° from the land, we had a strong westerly current; distant 1°, it set north-westerly; and close in shore, in soundings from 17 to 50 fathoms between Dassen Island and Table Bay, there was a strong eddy current to the southward, with which we worked to Table Bay in 30 hours. The Polyphemus, with Admiral Murray's flag on board, fell also to the northward of Table Bay in 1807, having made the land at Dassen Island with a southerly wind on the 10th March, in a thick fog, by the help of soundings.

From December to April, if it is not intended to touch at the Cape, a ship should get into lat. 37° or 38° S. about the meridian of Greenwich, and keep between 37° and 39° S. in running down her easting; for the winds will be found as favourable for this purpose in 38° or 39° S., or probably more so, than if she were in a higher latitude. In passing the Bank of Cape Agulhas, the stream of current setting westward ought to be avoided, by keeping in lat. at least 37° S., and she should not go to the northward of this parallel in running down her easting after passing the Cape, or she may be greatly retarded by the south-easterly winds which prevail in these months to the northward of lat. 35° or 36° S.

## ISLANDS NEAR THE ROUTE.

THE TRISTAN D'ACUNHA GROUP consists of three islands, the largest and northernmost being named after the Portuguese discoverer, Tristan d'Acunha. Three Americans remained here in 1811, to prepare seal skins and oil, but they were taken away before 1813. A naval station was formed here by the British, when Buonaparte was confined at St. Helena; this was afterwards discontinued. Tristan d'Acunha.

The ship Berwick, on her passage to Van Diemen's Land, touched at Tristan d'Acunha on the 25th March 1823, and found seventeen people, ten of whom constantly reside there: they had for disposal 25 tons of potatoes, also vegetables, milk, and butter; and they had two good whale-boats, ready to afford assistance to such vessels as might require a supply of fresh water. In payment for their assistance, or supplies, they prefer clothes, salt-beef, pork, and rum, as of more utility to them than money. In 1829, the number of British inhabitants had considerably increased, were very healthy, and the children were free from the common infantine diseases of populous countries.

This island is about 6 or 7 miles in extent, or 20 miles in circuit, of square form, being the base of a mountain, which terminates in a peak elevated 8,326 feet above the sea, sometimes covered with snow, when the sun is in the northern hemisphere, and may be seen at 30 leagues distance.

From the West point of the island, breakers appear to project about 2 cables' lengths, but the shore is bold to approach in other parts. At the North side of the island, the land rises perpendicularly 1,000 feet or more from the sea, then ascends with a gentle acclivity to the base of the Peaked Mountain, which rises majestically over the Table Land. This island, like St. Helena, is formed of abrupt hilly ridges, with chasms or deep valleys between them, and seems to be of volcanic origin. The trees which grow on the sides of the ridges are small, with spreading branches hanging

near the ground, but burn well.* Wild celery, wild parsley, and sorrel, grow plentifully; and wild goats and wild hogs are found in the interior.

The cascade, or watering-place, is about the middle of the North side of the island, where the water is excellent, and the landing on the East side of it, at four cables' lengths distance, upon a beach of round pebbles, is not difficult in fine weather.

There is anchorage near the cascade, in from 26 to 36 fathoms, from ½ a mile to 1 mile off shore. H.M.S. Lion anchored there 31st December 1792, in 30 fathoms black sand and slime, off shore 1 mile, a small rock off the West point of the island, bearing S.W. by S., just open with the western extremity, and the cascade of water falling on the beach S. by E.

Position. Capt. Heywood, who touched here in H.M.S. Nereus, 5th and 6th January 1811, made the waterfall or cascade in lat. 37° 6′ 9″ S., lon. 12° 3′ West by chronometer, measured from Rio Janeiro.

Mr. Fitzmaurice, in H.M.S. Semiramis, 5th of March 1813, by observations taken on shore at the cascade, made it in lat. 37° 5′ 36″ S., lon. 11° 57′ 45′ W. by chronometers, measured from the Cape of Good Hope: on a second cruize in the same ship, 15th November following, he made it in lon. 12° 2′ W. by chronometer, from the Cape of Good Hope, and in 12° 7′ W. by lunar observations. The mean of Mr. Fitzmaurice's observations makes the cascade of Tristan d'Acunha in lon. 12° 2′ W., corresponding within a mile of Capt. Heywood's observations. Some other ships' observations place it in lon. 11° 44′ to 11° 50′ W.

The variation of the compass in 1811 was 9° 20′ W., and in 1813 it was 9° 51′ W. by Mr. Fitzmaurice's observations.

Watering-place. Good water is got with great ease from a small lake at the east side of the bay, which is supplied by falls from the mountains: the casks may be thrown into the sea well bunged, and the surf will wash them on shore; when filled at the lake, they must be rolled about 130 or 150 yards over a soft sandy beach, hauled off by a line to the boats at anchor, and hoisted in by a mast or stump, fitted for this purpose. The water cannot be rafted off, on account of the sea-weed surrounding the island. The Semiramis filled 75 tons of water in this manner in November, sending the boats on shore in the mornings, and hoisting them in at night, the ship keeping under sail.

It is dangerous to anchor without great caution, as the sea rises suddenly prior to a strong N.W. or North wind, which is liable to drive a ship on the rocks if she cut or slip from her anchors in order to gain an offing. The Julia brig of war was driven on the shore from her anchors, dashed in pieces on the rocks, and several of her crew perished; other ships have narrowly escaped the same fate. If a ship venture to anchor here, she ought to put to sea immediately on the appearance of an unfavourable change, or if the wind incline to veer to the northward of West; but as the swell sets in often before the wind, it is in such case impossible to get under way, or a ship would be driven on the rocks, as the surf will then rise upon the shore, and it would be extremely dangerous to remain at anchor with a N.W. or northerly wind. There

Tides. is a rise and fall of tide, about 8 or 9 feet at times.

The shores of this, and the adjacent islands, are fronted by strong sea-weed, which is seen floating on the water in their vicinity, and patches of it extend to a considerable distance.

Winds. Easterly winds seldom continue longer than 24 hours at a time near these islands;

* Probably the Gum tree, which is indigenous here, at St. Helena, and Goughs Island.

but S.W. and N.W. winds prevail, with storms from N.W. in winter, and dark, thick weather, requiring great caution in ships which happen to be running here at such times, if not certain of their situation.* As soon as the wind veers to the northward of West, thick fogs immediately darken the atmosphere.

INACCESSIBLE ISLAND, bearing from Tristan d'Acunha W.S.W., distant 19 or 20 miles, is the middle, and the westernmost of the group, situated in lat. 37° 17′ S., lon. 12° 22′ W., or 7 miles more westerly than Tristan d'Acunha, being about 9 miles in circuit, and may be seen about 16 leagues distance. It is level and barren, with only a few scattered shrubs on it; the Semiramis' boat landed at a small pebbly beach, of which there are several small spots, with the mountain rising perpendicularly over them. Inaccessible Island.

There is no danger, only a rock, like a boat under sail, is visible at the S.E. point; soundings are got within a mile of the N.E. point, and 20 fathoms black sand with small reddish stones, when the body of the island bears West. Several streams of water issue from the top of the mountain.

NIGHTINGALE ISLAND, the smallest and southernmost of these islands, bearing from Tristan d'Acunha S.W. by S., distant 18 miles, is in lat. 37° 26′ S., lon. 12° 8′ W., being about 6 or 7 miles in circuit, having two rocky islets off the N.E. point, and some at the South point. On the East side there are soundings, and when the middle of the island bore W.S.W. Mons. D. Etchevery anchored in the L'Etoile du Matin, September 1767, in 33 fathoms, coarse brown and reddish sand. The boat found some difficulty in reaching the shore, on account of strong sea-weed twined together, and after a landing was secured, the interior could not be penetrated for reeds, and the shore was covered with penguins and eggs. The boat of the Semiramis landed here in 1813, and found plenty of water, sea-elephants, and seals. Nightingale Island.

These islands are not unfrequently seen by ships which haul far to the southward after leaving the S.E. trade, with the view of getting strong westerly winds.

GOUGHS ISLAND, OR DIEGO ALVAREZ, has been seen by several East-India ships, at various times and by mean of the observations and chronometers of 9 ships, its centre is situated in lat. 40° 19½′ S., lon. 9° 41¼′ W. Capt. Heywood, in H.M.S. Nereus, visited it on the 8th January 1811, and made it in lon. 9° 45¼′ W., or 2° 18′ East from Tristan d'Acunha by chronometer. Variation 10½° West. Goughs Island.

This island is about 5 or 6 miles in extent, or 15 or 16 miles round, elevated about 4,385 feet above the sea; its surface is covered mostly with a light coat of mossy grass, and some of the small bushy trees may be observed, which abound on Tristan d'Acunha.

The steep cliffs rise almost perpendicularly from the sea, having several beautiful cascades of water issuing from the fissures between them. The boat landed with safety at a cove on the North side of the island, close to the eastward of one of the rocky islets that adjoin to it on that side.

The Church Rock, exactly resembling a church with a high spire on its western

* This has been verified by the unfortunate loss of the Blendon Hall, from London, bound for Bombay, which ship was totally wrecked on Inaccessible Island, 23d July, 1821, where the crew and passengers suffered great privations, living on penguins and their eggs, till November 8th, when some of them reached Tristan d'Acunha in a small boat made out of the wreck, where they procured two whale boats, and returned to Inaccessible Island for the remaining part of the crew. On the 9th January, an English brig, from Brazil, touched at Tristan d'Acunha for water, took them all on board, and carried them to the Cape of Good Hope, where they arrived on the 18th.

end, is situated near the N.E. point of the island; and to the southward of this rock, on the East side of the island, lies an islet near the shore, within which the landing is safe and easy, being protected by the N.E. point from the swell and northerly winds. Here some men resided, belonging to the American ship Baltic, which ship the Nereus left at Tristan d'Acunha; these men had been rather unsuccessful during a long stay on Goughs Island, most of the seals having deserted it, but they procured plenty of fish and birds of good flavour for subsistence, by lighting a fire upon one of the hills in the night.

Between the islet and the S.E. point of the principal island, there seemed to be a small bay or cove, where the Americans said a ship might anchor in safety, about $\frac{1}{2}$ a mile off shore, in about 20 fathoms sandy bottom, tolerable holding ground. H.M.S. Semiramis visited this island in December 1813, and found none of the Americans there, but several had been buried, as ascertained by inscriptions placed at the burying ground; three boilers for boiling oil, and a quantity of salt for curing skins, were also discovered.

Doubtful Rocks.

Three doubtful sunken rocks, in lat. 37° 31′ S., lon. 4° 42′ W., were seen in the Hibernia, in April 1817, with apparently about 9 feet water over them, when passing close to one of them, which she narrowly escaped. But although the wind was strong, with a considerable swell at the time, the sea did not break on these supposed dangers, which is unaccountable, and gives reason to think they might have been three whales or huge marine monsters asleep, and not rocks.

# CAPE OF GOOD HOPE.

## THE BAYS AND COASTS.

St. Helena Bay.

ST. HELENA BAY, on the West coast of South Africa, is formed by Point St. Martin, in lat. 32° 40′ S., lon. 17° 54′ E., which is a low point projecting from the high land on the West side of the bay. Cape Deseada, in lat. 32° 18′ S., lon. 18° 17′ E., is a high bluff headland, about 10 leagues north-eastward from the former, and bounds the N.E. side of the bay. The coast stretches from Point St. Martin in a S.E. direction, the bay being about 4 leagues deep, with regular soundings from 12 or 10 fathoms to 6 and 5 fathoms near the shores, the bottom mostly sand and shells.

Berg River, a small stream, falls into the bottom of the bay, having some springs near it, and a few houses on each side.

In summer the anchorage is safe, as southerly winds then prevail; for this bay is only open to those winds which blow between North and West. During winter, when N.W. gales render Table Bay unsafe, St. Helena Bay is also unsafe, for these gales extend sometimes to the northward of this bay. The variation here was 23° 40′ W. in 1809. High water at 2 hours 30 minutes on full and change of the moon.

Near 5 leagues to the south-westward of Point St. Martin, there is said to lie a sunken rock 4 miles off shore: but perhaps it may be the following rock, which is to the *northward*, and not to the *south-westward* of that point.

Britannia Rock.

BRITANNIA ROCK appears not to have been known until the ship of this name

struck on it, October 22d, 1826, and she soon afterwards filled with water, when running in for the shore of St. Helena Bay. Capt. Bouchier, of the Britannia, thinks this rock to be of small extent, and very dangerous, as no indication of breakers was visible when the ship struck; at which time Cape St. Martin bore S.S.W., distant about 11 or 12 miles. No other bearings were taken, on account of the immediate exertion to endeavour to save the ship.

SALDANHA BAY entrance, in lat. 33° 3′ S., is about 16 or 17 leagues to the northward of Table Bay, having at its mouth the two Islands Jutten and Malgassen lying North and South of each other, between which is the proper passage; and Marcus Island, situated a little farther in, may be passed on either side. Saldanha Bay.

In running for this bay, you cannot easily miss it if certain of your latitude, although the islands at the entrance are low, and so near the main, that they are not easily discerned, unless a trusty person be stationed at the mast-head. Marcus Island may be approached on all sides within ½ a cable's length, but the widest passage is to the southward of it, and the best with a southerly wind; for in the summer, if you wish to anchor to the southward, in order to sail out with a S.E. wind, you will be able to fetch your anchorage; or if you run into Hoetjes Bay, you will have plenty of time to take in sail before you anchor.

Hoetjes Bay is on the larboard side of the entrance, having regular soundings in it of 4 to 5½ fathoms sand and shells, till you open the passages, when the water deepens to 7, 8, 9, 10, and 11 fathoms. Hoetjes Bay.

The best anchorage in Hoetjes Bay is in 6 fathoms, with the natural granite pier on with Marcus Island bearing S. by W., where ships of all descriptions are completely sheltered.

In Hoetjes Bay, it is high water at 2 hours on full and change of moon, rise of tide from 6 to 7 feet. Tides.

Capt. Cramer examined Saldanha Bay in H.M. Sloop Rattlesnake, in Nov. 1802, and describes it as follows.

Between Jutten Island and the main there is a safe passage, with from 7 to 11 fathoms sand and broken shells; both the shore of the island and the main may be approached within 100 yards; but to anchor, keep twice this distance from either, or you will have foul ground. Channels and dangers.

There is also a passage between Malgassen and the main, with from 10 to 20 fathoms foul ground, and several sunken rocks lie a full half mile off the N.W. end of the island; which, together with a heavy swell always setting into this passage, and being destitute of clear ground for anchorage, renders it unsafe, without a leading wind.

In the principal channel between the islands Jutten and Malgassen you will not have less than 13 fathoms sand. Marcus Island, as well as the North and South points of the main land, are bold to, there being 6 or 7 fathoms clear ground within 50 fathoms of this island, but when approached within about 50 yards, you will have 7 fathoms foul ground; the same from the island to the North point of the main land which forms Hoetjes Bay, off which, about a cable's length, lies a rock not larger than a small boat, dry at low spring tides.

S.E. from the point that forms Hoetjes Bay lies a sunken rock of considerable extent, called the Blinder Clip, not visible even at low tide when there is 3 feet water over it, unless the wind blow strong. The distance from this rock to the sandy beach of the main is less than a mile, with from 4 to 7 fathoms sand and broken shells.

The mark for the Blinder Clip is Marcus Island and the Mouse-Back in one, the latter being a piece of high land on the northern shore.

In working up from Hoetjes Bay to the head of Saldanha Bay, the starboard shore was found to be bold to, till within 1½ mile of Schapen (Sheep) Island, as a bank commences at this island, and terminates at the North point of a small bay farther down, being of a triangular form, with the point out from the shore called Salamander Point, and having on it irregular soundings from 5 to 3½ fathoms.

On the starboard side the soundings are regular 3½ and 3 fathoms till within half a mile of the beach. Adjoining to Schapen Island, in a northern direction, lies a small isle, with shoal water 2½ fathoms about a mile off the island, and the soundings on it are very irregular, not exceeding 6 or 7 feet in some places: between this and the eastern shore of themain, t here is a good channel up to Melvill's, or to the Old Post-House up the Lagoon.

In working up to Schapen Island, keep your lead going, as the soundings to the north-eastward are regular, and will be your best guide ; but in standing back to the S.W. get the N.W. end of Schapen Island in one with the Saddle Hill up the Lagoon, and then put about, as the water shoals quickly afterwards.

Bevian Bay is well sheltered from the N.W., but having much foul ground about it, Hoetjes Bay is far preferable, as ships may work out of it at all times.

We found the water very scarce, and had to send our launch up the Lagoon for it; it was found to be very good, but they cleared the well every time. Upon the high hill called Whitter Clip, about 5 miles distant, we were told there was plenty of good water to supply a large fleet, if it could be brought down.*

Capt. James Callander states, that the Berg River, being contiguous to the Bay, could be turned down into it, at a small expence; by which, not only shipping or a town might be supplied, but it would facilitate the cultivation of large tracts of land.

The marks for mooring at the head of Saldanha Bay are the Mouse-Back shut in half a cable's length with Salamander Point and the S.W. point of Schapen Island, distant from the latter 1½ miles. Here you will have from 4½ to 5½ fathoms sand and shells, with plenty of room to swing clear of the banks, should you part one cable.

Refreshments. Bullocks and sheep may be got from the farmers in the neighbourhood at a moderate price, and plenty of fish may be caught either with the net, or with hook and line: Reets Bay is the best place for the net or seine, having only 6 or 7 feet water, sandy ground ; the other places being rocky, are only fit for the hook and line. Most of the islands swarm with wild rabbits.

This is an excellent harbour, for ships to repair any damage they may have sustained by stress of weather at sea. The Thames, bound to Bencoolen and China, when near the Cape of Good Hope early in May 1812, found her bowsprit badly sprung, and not being able to get round the Cape to Simons Bay, she bore away for Saldanha Bay, and

* This bay, however, seldom affords a sufficient supply of good water even for a single ship; a remarkable example of this was experienced in the ship General Palmer, early in 1832, which ship, having fallen to leeward of Table Bay during a strong southerly wind, took shelter in Saldanha Bay, where she was detained by boisterous winds and a high sea prevailing outside, preventing her from being able to reach the short distance of Table Bay. It was hopeless and expensive to procure water from a distance of 20 or 30 miles by small waggons over bad roads, therefore, after a stay of several weeks in Saldanha Bay, the General Palmer bore away for St. Helena, to get a supply of water, which place she reached in 11 days, and was 21 days more on the passage from thence to Table Bay. In a similar case, if a ship fall to leeward, and run for Saldanha Bay, short of water, information should immediately be forwarded to Cape Town, which is distant only one day's journey, and 20 tons of water can be sent from thence in a few hours to the former place, by a decked cutter-rigged boat, built purposely for encountering bad weather.

secured her bowsprit there, in a few days' stay. The water was brackish, and in small quantity at this time, all round the coast about the bay.

Dassen Island.

DASSEN, OR CONEY ISLAND, is in lat. 33° 24′ S., about 7 leagues southward from the entrance of Saldanha Bay, and 8 leagues to the northward of Robben Island. It lies about 4 or 5 miles from the shore, is a low sandy island, dangerous and rocky on the West side. When we tacked 4 miles from the West part of it, in 17 fathoms sand, the sea broke over a sunken rock, distant 1½ miles from the S.W. end of the island. The South side is also said to be rocky, but there is anchorage within it. If the lead is kept going, there is no danger running in for the land hereabout in the night, as there are 17 fathoms about 2 miles outside of the foul ground about this island. Between Dassen Island and Table Bay, the water has a black stagnated appearance. At 2 or 3 leagues distance from the shore, we found an eddy current setting to the southward; when a little to the westward of the bank of soundings it set north-westerly. This part of the coast is of moderate height, barren and sandy near the sea; the interior is higher, and seems a better soil.

Soundings to the northward of Table Bay.

If a ship running for Table Bay be driven to the northward of it, by strong southerly winds in the summer season,* the soundings are a safe guide in approaching the land, if the lead is not neglected: between Saldanha and Table Bays regular soundings extend from the land several leagues.

In lat. 33° 30′ S., and 41 miles West from Cape Town by chronometers, there are 110 fathoms. From Dassen Island to Penguin, or Robben Island, the depths are from 50 to 56 fathoms about 5 leagues off; from 20 to 22 fathoms 3 or 4 miles from the shore; and about 30 fathoms 10 or 11 miles to the north-westward of the latter island.

Currents.

Although an eddy current may be setting along shore to the southward, from Dassen Island to Table Bay, the regular current, at the same time, often sets round the cape to the north-westward, as far as the high land on the West side of the bay; ships should, therefore, endeavour to make the land to the southward of the entrance, if bound into Table Bay, particularly if the wind incline from the S.W. or southward.

Table Bay.

TABLE BAY is so remarkable that it cannot be mistaken, by the contiguous high land, which appears like an island, when seen at a considerable distance from sea.

The highest part, from which the bay takes its name, is situated right over Cape Town, at the South part of the bay, and is called the Table Mountain. It is about 3,500 feet high, level on the top, and falls down nearly perpendicularly at the East end till it joins the Devil's Mount, which is a rugged peaked mountain, nearly as high as the former, and separated from it by a small gap. The West end of Table Mountain is also nearly perpendicular from the top to a considerable distance, and then has an abrupt declivity, till it joins the base of another mount, called the Sugar Loaf or Lion's Head; which is about 2,100 feet high. Near the summit of this rocky conical mount there is a spring of good water, and a flag is generally displayed on it when a ship appears, although in some places it is so steep, that it can only be ascended by steps cut in the rock. This is joined on the North side by an oblong mount, about 1,000

* To the westward of the Cape, in the summer months, the atmosphere is at times remarkably clear; the planet Venus, and even Jupiter, may be often seen at mid-day. About 1° W. from Table Bay, at 2 P.M. January 27th, 1798, when the altitude of the sun was about 55°, then shining bright, I observed the latitude very correctly by the planet Venus on the meridian, which was bright, and distinctly visible to the eye, without the assistance of a telescope, during most part of the day.

feet high, called the Lion's Rump. The Lion is on the West and S.W. sides of the bay; the Table Mountain and the Devil's Mount are on the South side. On the East side of Table Bay and of these mountains, the low sandy isthmus between Cape Town and False Bay is formed. The land is high and uneven from Table Mountain to the extremity of the Cape of Good Hope.

Winds.

The prevailing winds in Table Bay, and near the Cape of Good Hope, are from S.E. and southward during summer; the S.E. winds blowing more or less in every month of the year, and generally bringing settled weather. These winds extend more than 200 leagues to the eastward of the Cape. N.E. winds are less frequent than any, and never continue long. In May, June, July, and August, the West and S.W. winds blow strong, attended often with fogs and cloudy weather; but the N.W. winds are most violent in these months, frequently blowing in severe storms for several days together, with a clouded sky, and sometimes accompanied with lightning, hail showers, or rain. These winds extend as far as lat. 27° S., in the track from the Cape towards St. Helena, and prevail far to the westward, but much farther to the eastward of this promontory, although they are generally most violent near the land.

Table Mountain.

When the Table Mountain, in the summer months, begins to be covered with a white cloud, it indicates a strong S.E. or E.S.E. wind. In January, February, and March, these winds blow sometimes with great fury over the Table and Devil's Mount, and through the gap between them, driving the white clouds in rolling fleeces, like wool, over the perpendicular sides of the Table Mountain: ships ought, therefore, to moor with good cables, for they are liable to drive, and bring both anchors a-head. I have known several ships driven from Table Bay by these south-easters, with all their anchors down; and they did not regain the anchorage for 5 or 6 days. When the Table Mountain is free from clouds, the south-easter will be mild, and a gentle sea-breeze then generally blows in on the West side of the bay, while there is a fresh S.E. breeze prevailing from the East side of it, half-way across, during most of the day.

Proper season for anchoring.

The summer is from October to April, in which season it has been thought safe for ships to lie in Table Bay, notwithstanding that H.M.S. Sceptre, of 64 guns, and several other large ships, were wrecked by a severe N.W. storm, in November 1799. These N.W. gales are occasionally experienced about the Cape, in every season of the year; but they seldom blow home in Table Bay from November to May; and although several ships have been driven on shore by them more than once, in April, the Dutch fixed on the 10th of May as the period for all ships to leave this place, the strong N.W. winds being then daily expected. Such a mountainous sea is forced into the bay by some of these N.W. gales, that the anchorage becomes exceedingly dangerous. Therefore, if a ship proceed into this bay in the winter months, she ought to be furnished with good ground tackling, as many ships with their crews have suffered here, in June and July more particularly. On the 16th June 1722, the Company's ships, Addison, Chandois, and Nightingale, were driven on shore and wrecked. Captain Gilbert, of the Chandois, and Captain Pemberton, of the Addison, were drowned with most of their crews. At the same time seven Dutch ships were driven from their anchors and wrecked, with a loss of 600 to 700 men. Captain Mackett, of the Nightingale, was saved, and found at Table Bay, when the Company's ship Lethieullier anchored there, August 12th, 1722. Ships, however, venture into Table Bay in the winter months, notwithstanding the risk of N.W. gales; and the early navigators to India seem often to have touched there for refreshments in that season. About two centuries back it was usually called Soldania Bay.

The Hector lay in Table Bay from the 15th of June to the 4th of July, 1814, and made the variation 0° 35′ W., and the watering-place, in lat. 33° 54′ S., which is very near the truth, considering the imperfection of instruments, and the tables of the sun's declination at that period. In the 17th century, East-India ships, both Dutch and English, frequented Table Bay at all times of the year, to procure refreshments on their voyages to and from Europe. The Company's ship Thames, of 1,300 tons, anchored in Table Bay in 10 fathoms, June 16th, 1827, having, twelve days previously, taken the crew from the Elizabeth schooner, in a sinking state, which vessel belonged to this place. On the 17th she experienced a N. W. gale, with a heavy swell, then riding with the whole of the chain cable, which parted at 6 P. M., but the ship was brought up by the sheet anchor and whole cable. On the 18th the gale abated, and when the chain cable was hove in, the ring of the anchor was gone. Light breezes followed, from the southward and eastward on the 19th and 20th, and on this day she sailed, passed out between Penguin Island and the main, with light easterly breezes and calms, and Penguin Island was still in sight at noon 31st June, bearing S. E. ½ E., Table Mountain S. ¼ E., and the northern extreme of the land N. N. E.

Penguin or Robben Island.

Penguin, or Robben Island, is low and flat, distant 5 miles N. by E. from Green Point, which point, in day-light, may be approached within ½ a mile with caution, as the soundings decrease pretty regularly, and its fronting reef projects only ¼ of a mile; but the island should not be passed nearer than 2 miles, on account of the Whale, a sunken rock, distant 1 mile from its south extreme, on which the sea breaks when there is much swell; at other times it is not perceived. The soundings are from 20 to 15 fathoms about mid-channel in a direct line between the Whale and Green Point.

Whale Rock.

When the wind is from the South, a ship may borrow with caution towards Green Point,* to 10 fathoms in day-light, but not under 15 or 16 fathoms in the night; then steer for the shipping in the road, in 10, 9, 8, and 7 fathoms, regular soundings; taking care in the night not to borrow too close to the shore after passing Green Point, as the reef continues to front a projecting point within it, where the brig Singapore was wrecked.

Land and sea breezes.

In the fair weather season, regular sea-breezes from S. W. and West prevail in the mornings, which continue till noon, or longer; these are followed by strong S. E. winds from the land, which blow fresh during the afternoon, and frequently till the following morning; then the sea-breeze returns.

South-easters.

The south-easter sometimes comes from the land with great fury; it is therefore prudent to take a reef or two in the topsails, before a ship has reached Green Point, if near or a little past noon. By neglecting this precaution I have seen ships rounding the point with all sail set in a light breeze, suddenly meet the *fiery* south-easter on opening the bay, which compelled them to let fly every thing, to save their masts; and one of these ships, whilst the people were aloft securing the topsails, nearly ran on shore on the East side of the bay in wearing.

Anchorage under Penguin Island.

If, abreast of Green Point, a ship meet with a fiery south-easter, and be unable to work to windward, she ought to bear away and anchor under Penguin Island, taking care to keep at two miles distance from the South end of it, to give a berth to the Whale.† She may anchor off the North end of the island, about a large half-mile

* Two ships have been wrecked on the Reef fronting Green Point, by borrowing too close to it in the night; one of these, the Mulgrave Castle, a valuable ship; and also, lately, the brig Singapore.

† Or if well into the bay, she may run for the channel between the island and the main, and anchor in 8 or

from it, in 9 or 10 fathoms; but no nearer, as the reef projects from it a $\frac{1}{4}$ mile, and nearly the same distance from the S. W. and S. E. ends of the island.

The south-easters blow so strong at times, that a ship may not always be able to bring up under Penguin Island, and several have been driven to sea till the wind abated. If it be inconvenient to anchor under that island, make short tacks to the southward of Green Point, under lee of the High Land, until the violence of the south-easter is abated; and this seems preferable to the risk of losing an anchor, by endeavouring to bring up in a strong gale.

Channels.

It must be observed, that all ships going *into* Table Bay should use the channel between Green Point and Penguin Island, but the channel to the northward of this island is most proper for ships bound *out;* for the strong S. E. winds blowing out of the bay produce an outset, or partial current between the island and the northern shore; whereas the current frequently sets past Green Point into the bay, to replace the quantity of water driven out by the strong winds along the North shore.

After working from Dassen Island, in January 1798, to the entrance of Table Bay, we observed in the morning, that it was calm under the high land in the South channel; but a steady light breeze was perceived on the water between Penguin Island and the North shore. To preserve the breeze, we proceeded to work in by the North channel: about 2 P.M., the south-easter came to blow strong, carried away our top-sail sheets, and we were obliged to close reef the topsails, when beating through between the island and the main. We found a lee current whilst the wind was strong, and gained little ground until it moderated, about 8 P.M. In beating through, we did not stand nearer to the island than 8 fathoms; the soundings were from 8 to 12 fathoms sandy ground, but did not decrease much in nearing the main. From where we tacked on each side, the depths were generally from $9\frac{1}{2}$, to 11 and 12 fathoms across the channel. On the main, three rocky points project a small distance from a sandy beach, near which several sunken rocks were seen shining under water, about $\frac{1}{4}$ mile or more from the shore. Near the outermost of these rocky points, we shoaled from 10 to $7\frac{1}{2}$ fathoms at a cast; whilst in stays, I perceived some sunken rocks, about 2 cables' lengths within us, which render it unsafe to make too free with the shore in this part.

Between Green Point and Penguin Island the ground is foul; if a ship be driven by the swell towards the Whale Rock or Penguin Island in a calm, and obliged to anchor, the stream will be most convenient for this purpose where the ground is rocky. The proper anchorage in the bay, abreast the town, is sandy bottom; the West side of it being clear ground all over. In the summer months, a ship may moor in 7, 6, or 5 fathoms, with Green Point N. W. $\frac{1}{2}$ N., the body of Table Mountain S. W. $\frac{1}{4}$ S., and the flag-staff on the Lion's Mount W. $\frac{1}{2}$ S. off shore from $\frac{1}{2}$ to 1 mile, and from the town 1 or $1\frac{1}{2}$ miles. When N. W. winds are expected, do not anchor under 7 or $6\frac{1}{2}$ fathoms, where the swell runs more regular than in shoaler water. At these times, ships should ride with a whole cable, or more, for they are liable to drive if their anchors are not well seated in the sand; and when a ship drives, it is difficult to bring her up, as the anchors scrape along the surface of the sand, and do not take hold, whilst the heavy seas are striking against her. The best ground is from 5 to $7\frac{1}{2}$ fathoms. When so far out, as to have the Lion's Head in one with, or open to the northward of, the Lion's Rump, the ground is rocky quite across the bay.

Anchorage in Table Bay.

9 fathoms, $\frac{3}{4}$ of a mile distant from its eastern shore; where she may lie till the morning, when the south-westerly breezes will enable her to weigh and run for the anchorage at Cape Town.

Table Bay is an excellent place for obtaining refreshments: the water is good, but wood is very scarce. Sheep are to be had in abundance, at very moderate prices; also other provision of various kinds, and the vegetables and the fruits are good. The water is brought down in pipes to the pier, where boats fill it with hoses, leading from the pipes to their casks. The atmosphere about the Cape is generally cool in the night, although the sandy soil is often greatly heated by the rays of the sun: this occasions the land winds which blow out of Table Bay to come off in hot gusts in the evenings, when their course is over sandy ground. Refreshments.

In this bay, before the establishment of the time signal at the observatory, it was difficult to obtain rates for chronometers on ship board, in the fair weather season; for correct altitudes of the sun cannot be obtained, the refraction is so mutable near the horizon. During seven days' stay here, I took nearly 100 sets of forenoon and afternoon altitudes of the sun, to correct the rates of seven chronometers, but did not get their rates very exact. Objects in the horizon at the entrance of the bay were sometimes reflected double; a picture of a vessel under sail was seen distinctly in the atmosphere above her, and other objects were reflected in various ways. Refraction.

CAPE TOWN, by mean of six meridian altitudes of the sun, taken on board with an indifferent horizon, I made in lat. 33° 55½′ S., lon. 18° 28½′ E. by mean of the observations of different astronomers. Captain Owen, during his survey of the coasts of Africa, in 1822 to 1826, made the Devil's Mount in lat. 33° 57′ 12″ S., lon. 18° 21½′ E.; and Cape Town* in lat. 33° 55′ S., lon. 18° 21′ E., or 7 miles farther West than the longitude stated above. Cape Town observatory has lately been placed in lon. 18° 27′ 20″ E., by corresponding observations of culminations of the moon with stars near her, taken at the Greenwich observatory, and simultaneously by the Rev. F. Fallows, late astronomer at the Cape. Mr. Henderson, his successor, by a comparison of 79 observations of transits of the moon, taken at the Cape Town Observatory, with corresponding ones taken at Greenwich, Cambridge, Edinburgh, and Abo, made the observatory in lon. 18° 29′ E.; and as the observatory is about 3¼ miles East of Cape Town, the latter is in lon. 18° 25′ 45″ by this result. Captain Foster, of H.M.S. Chanticleer, made Amsterdam battery in lat. 33° 54′ 46″ S., lon. 18° 25′ E. Cape Town. Position.

A time signal is now established at the Observatory for the rating of ships' chronometers, and the Signal Disc is dropped daily, Sundays excepted, at the hour of one o'clock, Cape Mean Time. The moment of observation is the moment of the *separation* of the Disc from the cross bar at the head of the mast. Time Signal.

The tide seldom rises more than 5 feet perpendicular in Table Bay; high-water at half-past two o'clock on full and change of the moon. Ships moor with their anchors about N.W. and S.E. Tides.

| | |
|---|---|
| Table Mountain E. 12 leagues, the var. was 25° 40′ W. in Feb. 1798 | Mean of many morning azimuths, |
| Ditto ... ditto ...... 14 ditto.....................25° 40′ ...... ditto 1800 | each time by two compasses. |

A light house, with a double light, has been erected on the projecting point of land between the Great Mouille, or Moulin Battery, and Three Anchor Bay, under the Lion's Rump, at the entrance of Table Bay; and the following directions are given for sailing into Table Bay by night: Light House.

Coming from the southward and westward with a leading wind, and not having Of entering Table Bay by night.

* Captain Beaufort, of the Royal Navy, by observations taken on shore with an artificial horizon, made Cape Town in lat. 33° 55′ S.

made the Light-House before night, steer along the coast to the N.E. until you open the lights of the rising land, about the Lion's Head, when the two lights will be their breadth open of each other, and bear about E. by N.; then haul in towards them, taking care to keep the lead going, and not to come under 18 fathoms till the lights bear S. by E., which will carry you about a mile clear of danger, fronting Green Point; steer to the eastward until the lights come on with each other; *i.e.* are in one, or until they bear S.W. ½ S., you will then be abreast the north-western extremity of Table Bay, and may haul in S. by E. or S.S.E. according to circumstances, for the anchorage; when the lights are shutting in by the rising land of the Upper Mouline Battery bearing N.W. by W., you will be approaching the outer anchorage, and may safely anchor for the night in 7 or 8 fathoms water, fine sand. Care should be taken not to run into less than 5½ or 6 fathoms, unless well acquainted.

Ships coming from the northward and westward should observe the same directions with respect to passing the lights, &c.

Ships working in, with the wind from the southward and eastward, after being abreast the lights, should not stand to the eastward farther than 2½ or 3 miles, or until they shoal the water to 8 or 7½ fathoms. These bearings are by compass, and the directions are by Mr. J. Goodridge, master attendant, and lately corrected by Lieutenant J. Bance, harbour-master, at Cape Town. Variation 27° W. in 1826.* From the Cape of Good Hope to Table Bay the shore is mostly steep, and may be approached within 2 or 3 miles distance in sailing along towards Green Point, which is low, and forms the northern extremity of the peninsula.

Hout Bay.

HOUT BAY, about 3 leagues to the southward of Green Point, is situated at the north end of an excavation in the land, and is said to afford shelter from all winds, to a small number of ships; but is rather confined, and has a ledge of rocks at the entrance. A ship in passing the points which form this bay, should keep two miles from the land, to give a berth to some straggling rocks detached from the shore, keeping about the same distance from it till she reach Green Point, to avoid some rocks fronting the shore, between the Sugar-Loaf and that Point; most of which rocks are above water, and within ½ or ¾ of a mile of the shore; the depths of water about 1½ or 2 miles off, are from 50 to 60 fathoms. In a case of emergency, a ship might pass between the shore and the ledge of rocks fronting Hout Bay, which was effected by the Company's ship Abercrombie Robinson, 27th January, 1831, in soundings from 8 to 13 fathoms. She had been drifted by the current during a fog into the mouth of the bay, where she anchored in 7 fathoms, about a ¼ of a mile inside the ledge of rocks upon which the breakers were perceived as the fog cleared away.

Cape of Good Hope.

THE CAPE OF GOOD HOPE is the southern extremity of the Peninsula, which separates False and Table Bays from each other, and the terminating promontory of the West coast of Africa to the southward. From Table Bay to this Cape the land is

* A flag-staff is erected on the Lion's Rump, for the purpose of communicating with ships entering Table Bay, by means of Capt. Marryat's Code of Signals, now in general use in the Merchant service.

Vessels approaching the land have, therefore, only to make use of that Code, as directed, for the purpose of either conveying, or receiving, communications to or from the Signal Post on the Lion's Rump.

It is to be recollected, that at this flag-staff, a Colonial Telegraph is also in use; but no mistake can arise therefrom, if ships in the offing pay attention to Captain Marryat's Code, the flags of which are entirely different from those of the Colonial Telegraph.

of considerable height, rugged and uneven, ending in hummocks at the Cape Point. The latitude of the extreme point is about 34° 22′ S.* (by Captain Owen), and $3\frac{1}{4}$ miles East from the meridian of Cape Town, or nearly on the meridian of the observatory; which, by Mr. Henderson's statement, will place the Cape of Good Hope in lon. 18° 29′ E.; but Captain Owen made it in lon. 18° $24\frac{1}{2}$′ E.

THE BELLOWS, a large rock, even with the water's edge, about 2 miles distant, nearly S. $\frac{3}{4}$ W. from the highest land of Cape Point, has the sea usually breaking on it; but not always upon the tail of the reef that projects from its S.W. extremity. Bellows Rock.

THE ANVIL, another sunken rock, lies about 2 miles or more E. $\frac{1}{2}$ N. of the Bellows, and distant about 2 miles from Cape Point; there is a passage between these rocks, and another betwixt them and the land, with soundings from 20 to 7 fathoms, but they are not frequented,† the bottom being rocky, and the current sometimes strong. The Colebrook, Indiaman, was lost in August, 1778, on a rock thought to have been the Anvil, its true situation being then not exactly known. Captain Huddart placed it about *true* East from the Cape Point. Captain Owen's late survey makes it $\frac{2}{3}$ of a mile farther south than the Cape Point, and $1\frac{2}{3}$ of a mile more to the eastward. There is thought to be 14 feet water on the Anvil Rock, and it is of small extent.‡ When the Colebrook struck, the Royal Admiral passed within the rock at a mile distance between it and the land; before and after striking on it the former ship had 30 fathoms water. Anvil and other rocks.

FALSE BAY entrance is formed by the Cape of Good Hope on the West side, and False Cape on the East side; the latter is a steep bluff, resembling a quoin, which may be seen at 8 leagues distance, and appears to lean over to the West when viewed from the southward, from which, probably, it was called Hanglip, or Hangclip, by the Dutch, but sometimes Hottentot's Point; it is situated in lat. 34° $23\frac{3}{4}$′ S., lon. 18° 45′ E., by Captain Owen's survey; but in 18° $50\frac{1}{2}$′ E., by the deductions of Mr. Henderson, the astronomer. The entrance of the bay, from Cape to Cape, is about 5 leagues wide, False Cape being to the southward of the Cape of Good Hope, nearly 2 miles. The bay extends northward into the land about $5\frac{1}{2}$ leagues, being large and open, of square form, having several dangers in it, none of which are situated near False Cape, or in the eastern side of the bay.§ False Bay.

Across the entrance of False Bay, the depths of water are from 40 to 50 fathoms; but a little to the westward of the middle of the entrance there is a bank of rocky ground, with soundings on it from 16 to 30 fathoms, having 45 and 46 fathoms within it, and 60 fathoms to the southward.

The middle and eastern parts of the bay are thought free from dangers, but the ground is foul and improper for anchorage.

As you enter False Bay, a ridge of rugged mountains is perceived to the northward,

* Some navigators make it in lat. 34° 23′ S.

† The Cumberland, with the direct ships for China, under convoy of H.M.S. Doris, 15th June, 1813, at $\frac{1}{4}$ past 8 A.M., had the Cape of Good Hope bearing N.W. by N. distant $\frac{1}{4}$ of a mile, with the wind at N. westward: she then steered into False Bay between the Bellows Rock and Cape Point, keeping about E. by S. nearly mid-channel, $1\frac{1}{2}$ miles from the Cape of Good Hope.

‡ A master of the navy, who surveyed False Bay, asserts, that there are other rocks near the Anvil.

§ At its N.E. angle there is a small concavity, called Gordon Bay, where a ship might be sheltered from south and easterly winds, in 8 or 9 fathoms water. Pringle Bay is a sort of cove on the north side of Cape False, not so much sheltered as the former.

which ends at the entrance of Table Bay. The Table Mountain is seen in clear weather, when the distance from it is 60 miles to the southward, and very distinctly from the entrance of False Bay. From False Cape, another ridge of mountains extends to the northward, along the eastern shore, to the bottom of the bay. The space between these ridges is low land, the mountains seen over it being at a great distance in the country.

Whittle Rocks. The danger most in the way of ships working into, or out of, False Bay, is the WHITTLE ROCKS, which are an extensive ledge of rocks, nearly a mile in circumference, covered with from 5 to 15 fathoms water excepting the shoalest spot, which has only from 12 to 15 feet water on it at low spring tides, and appears to be about 6 feet in diameter. It is steepest on the S.E. side; and another rock with $4\frac{1}{2}$ fathoms water on it, lies South 40 fathoms from the shoalest part of the Whittle Rocks. There are others to the N.W. about a cable's length from it, with 4 and 5 fathoms water on them.

The Trident, Asia, and several other ships, have struck on these dangers.

From the N.E. verge of these rocks, the Cape of Good Hope Point bears by compass S. $51\frac{1}{2}°$ W.; Outer Smith's Winkle, West; Commandant's House, N. 40° W.; Noah's Ark, N. 35° W.; West Point of Fish-hook Bay, N. 20° W.; Muyzenberg Point, N. 3° W.; Peak of the Devil's Mount, N. $5\frac{1}{2}°$ E.; Seal Island, N. 34° E.; and the extremity of Cape False, S. $33\frac{1}{2}°$ E. Variation 28° W., in 1811. Captain Owen makes Whittle Rock in lat. 34° $16\frac{1}{2}'$ S., lon. 18° 29′ E., and it lies $4\frac{1}{2}$ miles E.S.E. from the North point of Little Smith's Winkle Bay, and about 8 miles from Cape Point. Lieutenant Whittle examined this danger, and found it to be a rocky bank, about a $\frac{1}{4}$ mile broad, on which there is a rock with only 12 feet water over it at low tide. On the 12-feet rock, the angle of Cape False and Cape Point, taken with a quadrant, was 87°, and the summits of two hills over Fish-hook Bay, just touching each other. The Francis struck on a spot about a mile to the northward of the Whittle Rocks, but probably the bearings were not correctly taken, and that it might be on one of the northernmost of the Whittle Rocks where she struck.

If a ship, coming from the westward with a N.W. wind, is bound to Simons Bay, she may pass to the southward of the Bellows Rock at any discretional distance. When abreast of it, at 2 or 3 miles distance, the course ought to be E.S.E. to E. by S., till she has run 5 or 6 miles; she may then haul up E.N.E. and N.E., taking care not to approach the Cape Point nearer than 5 miles, till it bear W.N.W.; being then to the northward of the Anvil and Colebrook Rocks, she may haul in, within 2 or 3 miles of the western shore, into moderate depths for anchoring.

To sail into False Bay, and Simons Bay. A ship coming into False Bay from the eastward should steer for the middle of the bay, or for the West side of it, with a S.W. or westerly wind. When the Cape Point bears W. by N. she will be clear to the northward of the Anvil, or other sunken rocks supposed to be situated near the Point, and may then borrow on the western side of the bay, within 2 miles of the shore, or less, if requisite. When 6 miles within Cape Point, and abreast the rocky hill over Little Smith's Winkle Bay, she ought not to stand farther from the shore than 3 miles in passing the Whittle Rocks, and should it fall calm, she may anchor in moderate depths near the western shore. To avoid this danger, a ship should go to the westward of it, keeping within 2 or 3 miles of the land, in passing between Little and Great Smith's Winkle Bays, taking care, in passing abreast of it, that the angle of Cape False and Cape Point is not increased to 85° when measured by a quadrant. Close to this dangerous patch, the soundings are 20 and 22 fathoms. Ships may pass to the eastward of the Whittle Rocks, and between them

and the reefs to the southward of Seal Island; but the western channel seems preferable for strangers, the land affording them a sufficient guide. After passing the Whittle Rocks, a ship may continue to steer or work along the western shore, at the distance of from 1 to 3 miles; when she approaches Simons Bay, Noah's Ark will be discerned, which is a level islet near the South point of the bay; but the marks most conspicuous, and seen farthest off, are *white sand downs*, appearing like snow, in the hollows between the mountains to the N.W. of Noah's Ark, as represented in the plan of False Bay, by Captain Joseph Huddart.

Noah's Ark is steep to, having 9 fathoms close to it; the soundings in the channel, between it and Roman Rocks, are from 10 to 15 fathoms; from hence a ship should steer direct for the white sand downs, till she reach the anchorage in Simons Bay. If working with a N.W. wind, she may proceed by the channel outside of Roman Rocks, which is clear and much wider than the common channel between them and Noah's Ark, taking care not to borrow very close to the N.W. side of Roman Rocks, as a rock, with 3 or 4 fathoms water on it, is said to lie at a small distance from them in this direction.

Eastern Channel.

To work into False Bay, and to the eastward of the Whittle Rocks, towards Simons Bay, a ship should not bring Cape Point to the southward of S.W. by W. till Noah's Ark bear N.W. by W.; and when on the starboard tack bring Noah's Ark nothing to the northward of this bearing, by which the Whittle Rocks will be avoided; but she must not stand far to the North, towards the sunken rocks extending southward from Seal Island, which, by ships turning to windward, should not be approached nearer than 4 miles on the South side, or 3 miles on the North side.

Simons Bay.

SIMONS BAY is situated 4 leagues northward from Cape Point, near the N.W. corner of False Bay, at the foot of the highest mountain on the coast. From April to September, when Table Bay is unsafe, ships put into Simons Bay, and in every month of the year this is considered a place of safety. Although it is open to north-easterly and easterly winds, which come from the bottom of False Bay, or from the mountains on the coast, these never blow strong; so that it may be considered a safe retreat for 13 or 14 sail of ships at all seasons; but being small it cannot contain a numerous fleet properly sheltered from S.E. winds. The ships in this bay receive refreshments and supplies of provisions from the interior, and from Cape Town, distant from hence about 6 leagues; water is conveniently obtained, and is excellent. At a small distance from the south point of the bay, there is an islet or rock, in the form of a barn, called Noah's Ark; about a mile N.E. $\frac{3}{4}$ E. from this a small reef is situated near the water's edge, called Roman Rocks; between these is the common channel for ships. From Roman Rocks, about 2 leagues E. $\frac{1}{2}$ S., lies Seal Island, having straggling rocks above and under water near it, some of which extend 2 and 3 miles to the southward, and near 4 miles to the eastward; breakers are always seen when the sea runs high. The Warren Hastings, in 1795, struck on one of the southernmost of these rocky patches, whilst in stays; False Cape bore S. by E. $\frac{3}{4}$ E., Cape Point S.W. $\frac{1}{4}$ W., a high peak at the bottom of False Bay, N. by W., and the ships in Simons Bay W. by N. $\frac{3}{4}$ N.

Dangers near Seal Island.

Anchorage.

The dockyard in Simons Bay is in lat. 34° 11½′ S., lon. 18° 21′ E., by Captain Owen: the depths of water 8, 9, and 10 fathoms in the bay. A good berth for a large ship is Noah's Ark on with Cape Hanglip, S.E. by S. and the North Battery N. by W. by compass, off shore about 1 mile; or a ship making a long stay may moor farther in, with Cape Hanglip shut in by the South point of Simons Bay, but it is best to moor at a convenient distance from the shore, to have room in case of driving. Although the bottom is

sand, the anchors hold well when seated in it. Ships moor in this road N.W. and S. E. from May to September, with the stoutest ground-tackle to N.W., for this being the winter season, the winds prevail from that quarter, and often blow in strong gusts over the hills; from September to May, the S.E. and southerly winds may be expected to predominate, then the best bower should lie to the S.E.; but in this season ships generally prefer Table Bay.

Periodical winds.

Tides.

In Simons Bay it is high water at ½ past 3 o'clock, on full and change of the moon; the rise and fall of tide is seldom more than 3 feet, and there is little current perceptible here at any time.

To sail from Simons Bay.

From October to April the south-easterly winds generally prevail, but do not continue longer than 5 or 6 days at a time, and are constantly succeeded by variable winds. In Simons Bay, as in Table Bay, it frequently happens that these winds after blowing very strong for a day and part of the night, abate towards morning, and are succeeded by a land-breeze from W.N.W. By taking the advantage to weigh with the first of this breeze, a ship may sometimes get to sea before the return of the south-easterly wind; if she cannot get clear out before the strong S.E. wind set in, the most prudent plan will be to return to the anchorage in Simons Bay.

Ships bound to the eastward should leave the bay when N.W. winds begin to blow; if bound westward, in the winter season, they ought to remain till these winds are on the decline, and get under sail when they shift to westward, as it is probable they will veer from West to S.W., South, and S.E., which will be favourable for doubling the Cape.

Caution.

Ships from the eastward, bound into False Bay, or even into Table Bay, should be particular, when S.E. winds prevail in the summer months, not to fall to leeward of the Cape; for it will often be found very difficult to gain the former of these bays, if a ship make the land about the Cape bearing to the eastward, during strong S.E. winds. Ships from India, at different times, bound into Table Bay with stores, have been obliged to bear away for St. Helena, on account of passing the Cape in the night, unable to beat up against the strong easterly winds and leeward current.

The Cape of Good Hope is frequently the boundary of very different kinds of weather; for ships homeward-bound have in general unsettled cloudy weather, and the winds variable to the eastward of it; but when they get round to the westward of this promontory, the weather generally becomes favourable, with a steady south-easterly wind; this usually happens, but more particularly in the summer season.

Coast eastward of Cape Hanglip.

From Cape Hanglip the coast takes an easterly direction 8 or 9 leagues, then turns round to the southward in a headland, named Point Danger, by which a deep concavity called Sand Down Bay, is formed between them. A reef projects a considerable distance from the latter Point, and near it there is a Bluff Hill, with a small isle about 3½ leagues to the eastward of the point near the shore, called Dyer Island, which is also fronted by rocks. Betwixt Dyer Island and Cape Agulhas there is a small projection, called Quoin Point, a little to the westward of the Gunner's Quoin, which point is in lat. 34° 49′ S., lon. 19° 37′ E., by the survey of Captain Owen.

# CAPE AND BANK OF AGULHAS.

## DESCRIPTION OF THE COAST AND BANK—CURRENTS.

### DESCRIPTION OF THE COAST AND BANK.

CAPE AGULHAS, OR AGUILHAS,* bears S.E. from the extreme point of the Cape of Good Hope, distant about 30 leagues: it is the southernmost land of Africa, and is in lat. 34° 51½′ S.,† lon. 19° 56½′ E., by Captain Owen's survey. This Cape being placed too far to the northward in some nautical works, has been the cause of dangerous mistakes to several navigators bound to the westward. Cape Agulhas is low even land, about the height of North Foreland, and may be seen at 5½ or 6 leagues distance from the deck of a large ship. There is no high land within several miles of it in any direction; but to the north-westward, at the distance of about 3 or 4 leagues from the Cape, there is an isolated hill near the sea, called the Gunner's Quoin, which it resembles when seen from the eastward. This hill may be seen 9 or 10 leagues off, and is a mark for ships passing at too great a distance to see the low land near the Cape. Ships coming either from the eastward or westward, and only arriving in sight of the Quoin, or other high land in the vicinity of Cape Agulhas, in the evening, should, if the wind is scant from southward, be aware that the low land of the Cape projects much farther to the South than any of the high land adjacent. By attending to this, they will avoid getting into the bays on either side of this Cape. In December, 1795, the Milford got into Struys Bay on the east side of Cape Agulhas in the night; they were first alarmed by the noise of breakers on the shore, when they thought themselves clear of all the land to the southward; at this time the wind was light, and the swell setting on the shore, obliged them to anchor; when day-light appeared, the breakers on the beach were not above 2 miles distant. With a fresh wind, which set in from S.E., this ship had some difficulty in working out of this deep bay. Cape Agulhas. Struys Bay.

The ship Star, from Amboina, bound to London, got into this bay in the night of October 2d, 1801. The journal says: "Got into the bay eastward of Cape Agulhas, heard the noise of breakers, had 6 fathoms, and tacked to the eastward; after tacking, had 7, 7, 7½, 8, 7½, and 7 fathoms, then heard the noise of other breakers a-head; tacked, and lay up S. by W. with a light south-easterly air, and deepened to 8½ fathoms; being then 3 A.M., a breeze at N.N.W. came from the land, steered out S. by E. till day-light; hazy, no land seen in the morning."

* Called by its discoverers, the Portuguese, Aguilhas, or Needle's Cape, because the magnetic needle had no variation there at that time. The Portuguese name has been corrupted by the English sailors into Lagullas, or Lagullus. In 1598, the variation at this Cape was 0° 30′ W., at the Cape Good Hope 25′ E., and at Cape False no variation.

† Some navigators state it to be in lat. 34° 50′ S., and it has been usually placed several leagues more easterly than stated above. Captain Biden, of the Thalia, made it in lon. 20° 8′ E., and it is placed in lat. 34° 48½′ S., lon. 20° 10′ E., by Mr. Walker, of H.M. brig Dispatch, who constructed a Chart of South Africa, from his numerous observations, while employed in the coasting trade.

This bay is about 2½ leagues wide between Agulhas Point and the first low point to the north-eastward. The Arniston, transport, from Ceylon, bound to England in 1815, being supposed by her commander to be to the westward of the Cape, edged away to the N.W. for St. Helena, and got into Struys Bay during a strong southerly gale; not being able to ride at her anchors, she drove on shore, and out of 300 persons only 5 or 6 survived that catastrophe.

Agulhas Bank. From the Cape of Good Hope, along the South coast of Africa to Algoa Bay, a bank of soundings extends a considerable distance from the land, and is generally called the Cape Bank, or Bank of Agulhas. The southern extremity of the bank is nearly on the meridian of Cape Vaches, or in lon. 22° E., and is said to extend nearly to lat. 37° S. in this part;* but a little to the southward of lat. 36° S., it converges quickly and becomes of a narrow conical form, having very deep water on its southern end. The soundings on the bank westward of Cape Agulhas, to the South of lat. 35° 15′, are generally found to be mud; to the southward of the Cape, frequently green sand, or sand of various kinds; and on the S.E. and eastern parts of the bank, to the eastward of Cape Agulhas, the quality of the ground is mostly coral, or coarse sand, shells, and small stones.

Before lunar observations were practised at sea, it was customary for ships to get soundings on the Bank of Agulhas, to correct their reckoning; which is no longer requisite, for the longitude obtained by observation must be more exact than can be ascertained by sounding on the bank.

Grampusses, or whales, are frequently seen floating with their backs a little above water, more particularly in moderate weather with easterly winds, when the water is smooth on the bank; at such times a ship may be liable to run against one of them before it is awake, which has actually happened to some ships, and greatly alarmed all on board. Very large seals also frequent the Cape Bank and its vicinity.

Gannets (or Soland Geese) are generally seen on the bank in moderate weather; they are about the size of the domestic goose, entirely white, except that the extremities of the wings are tipped with black. They beat their wings quickly in flight, like a duck or pigeon, and are easily known from other large aquatic birds, whose wings are much longer.

Abreast of Cape Agulhas, the Gunner's Quoin, and the land to the eastward of that Cape, the depths of water are from 40 to 50 fathoms, at 3 and 4 leagues distance from the shore.

## CURRENTS.

Current. The set of the current, round the Cape Bank, was first explained by Major Rennell, in 1777, who published a chart of the bank, exhibiting the direction of the current, and its velocity in the winter months.

As he has observed, the current in general is strongest during the winter months, but it is sometimes found in other months to run equally strong. It runs with the greatest velocity along the verge of soundings, and a little outside of them, the direction of the stream nearly all round conforming to the outline of the bank. Far in upon it, near the land, the current is very weak, it is therefore advisable for all ships bound

* It has been said, that soundings of 91 fathoms were got on the tail of the bank in lat. 38° 15′ S., lon. 20° 40′ E.; but it remains uncertain, if the bank really extends thus far South. The Warren, however, had ground 125 fathoms in lat. 36° 46′ S.

to the westward to keep near the edge of the bank when they have contrary winds, that they may benefit by the current.*

Although a strong current sets round the Cape Bank to the westward, during both the winter and summer seasons, it is frequently obstructed by various causes, particularly with strong gales from West and S. W. When these blow, the current is sometimes completely repressed for a short time, but runs with redoubled strength immediately after these gales abate; at other times it continues to run with considerable velocity against the strongest gales, producing a very high sea; but far in upon the bank, towards the land, where the current is generally weak, the sea is always more smooth, and the winds more moderate.

Eastern limit of the current.

Ships coming from the eastward begin to experience the Cape Current when they approach the eastern verge of the bank in lon. 28° E. to the eastward of Algoa Bay; sometimes it prevails much farther to the eastward, and along the coast of Africa, a considerable way to the north-eastward. Bound from Bombay to London, in the Anna, we began to experience the westerly current, July 28th, 1801, in lat. $30\frac{1}{2}$° S., lon. 37° E. On this day it set West 38 miles by chronometers; on the subsequent day, West 35 miles; July 30th, it set W. 16° S. 48 miles; on the 31st, it set W. 12° S. 77 miles; lat. at noon $32\frac{1}{2}$° S., lon. 31° 40′ E.; during this time, the winds were light at S. E. and eastward. August 1st, the current was checked by a strong gale, veering from N. E. to N. W. and W. S. W.; on the 2d and 3d, had a set of 30 miles to the westward each day; saw the land near Cape Recife on the 3d; from hence, had the winds variable with two gales at Westward, till we got round the Cape of Good Hope on the 13th, in which time the current set generally 15 or 20 miles to the westward daily, and one day 45 miles in this direction. During the westerly gales the current was completely checked, and by the force of these winds, it sometimes set eastward. From China, bound to London, in the same ship, we got into the stream of the Cape current April 21st, 1799; on the preceding day, the noon lat. was 35° 11′ S., lon. 27° 59′ E., had no current; on the 21st, lat. 35° 3′ S., lon. 26° 52′ E., the current had set W. 32° S. 27 miles by chronometers; from noon 21st to noon 22d it set W. 19° S. 52 miles, lat. 35° 13′ S., lon. 25° 5′ E., at noon 22d, light winds from westward; from the 22d to the 23d, the current set W. 36° S. 87 miles, being above $3\frac{1}{2}$ miles an hour, lat. 35° 56′ S., lon. 22° 51′ E., on the 23d at noon. By the strength of current this day, the ship was greatly agitated, the sea it produced rising in confused heaps, although the breeze was moderate at W. N. W. Noon the 24th, lat. 35° 30′ S., lon. 18° 58′ E., the current having set W. 19° S. 32 miles; at noon 25th, abreast of Cape False, this day no westerly current, but a set of 9 miles northward.

Direction and velocity.

The Arniston and fleet saw the land, May 28th at noon, 1805, in lat. 30° 57′ S., lon. 31° 0′ E., and until the 29th, at 5 P.M. At noon 29th, lat. 32° 25′ S., lon. 30° 0′ E., the current set S. 38° W., 88 miles from noon 28th. At noon 30th, lat. 34° 14′ S., lon. 27° 46′ E., current set W. 14° S., 44 miles from 29th. Noon 31st, observed lat. 34° 21′ S., lon. 26° 36′ E., current W. 22° S., 65 miles from the preceding noon. Noon 1st June, lat. 34° 53′ S., lon. 25° 15′ E., current set W., 16° S., 66 miles from the preceding noon. Noon 2d, lat. 36° 12′ S., lon. 22° 36′ E., current set S. 40° W., 74 miles from noon preceding. Noon 3d June, lat. 36° 23′ S., 21° 42′ E. by chronometers, current set S. 35° W., 27 miles from noon 2d. When more to the westward, lost the current.

* But they ought not to stand too far to the southward beyond the verge of soundings, where they will be subject to violent gales from the westward in the winter months, outside the stream of the current; and may perhaps get disabled, and be obliged to bear away for St. Augustine Bay, or Port Louis, to refit, which has happened to many ships.

The abstracts here adduced are to show the general direction and velocity of the current, in its course round the edge of the Bank. Although it may at a medium rate be taken at less than mentioned above, yet at some particular times the velocity of this stream *seems* to be greater than exhibited in these abstracts, as appears by the Northampton's Journal, and those of some other ships.

Singular instance of its strength.

The Northampton, Dec. 23, 1802, at 9 A.M., saw the Coast of Africa bearing North, about 25 leagues. At noon, lat. 35° 0′ S., lon. by chros. 24° 54′ E., Dec. 24th, variable light airs, and a very confused swell, which makes the ship very uneasy. Find we have had a current of 47 miles to the southward, and 160 miles to the westward by chronometers, these 24 hours. Observed at noon, lat. 36° 33′ S., lon. 21° 53′ E., by chros., which gives the direction of the current W. 20° S. velocity 139 miles, or $5\frac{1}{2}$ miles per hour.

It is difficult to assent to a current of such velocity as this, although it may be possible; for constant gales from the westward prevailed along the Bank during the first and middle parts of the month, which prevented the ships bound round the Cape from making any progress, until these winds abated about the 20th December. It is therefore probable, that the current at this time began to set very strong to the westward along the Bank, as it had been repressed a considerable time by the strong westerly gales.

The general course of the current round the Cape Bank appears conformable with the following description.

In June, July, and August, from about lon. 37° or 40° E. the current generally sets westward, between lat. 30° and 35° S., till it reaches the eastern part of the Cape Bank, off Algoa Bay.

General Direction.

On the coast of Natal, it sets along shore to the south-westward till joined by the oceanic stream, on the edge of the Bank, in lon. $27\frac{1}{2}$° or 28° E., between Algoa Bay and Infanta River. After the junction, it increases in strength off Cape Recife, the South extreme of Algoa Bay, and takes the direction of the outline of the Bank, which is about W. by S. nearly, to about lon. $23\frac{1}{2}$° W. In this space, it often diverges a little from the outline of the Bank, setting W. by S. $\frac{1}{2}$ S. or W. S. W.; but seldom to the northward of West. In lon. $23\frac{1}{2}$° E. the edge of the Bank begins to take a south-westerly direction, and soon after about S. S. W. $\frac{1}{2}$ W., nearly to its southern extremity. Here also the current follows its concave outline, taking a south-westerly course in lon. 24° E., and from 23° E., it generally sets about S. W. by S. to the southern extremity of the Bank, in lon. $21\frac{3}{4}$° or 22° E. The velocity of the current is greatest from lon. 25° to 22° E., along that part of the Bank which takes the most southerly direction. At the southern extremity of the Bank, it seldom runs strong* beyond lat. $36\frac{1}{2}$° S. or to the westward of lon. 21° E. From hence, a part of it seems to set weakly to the westward, and is lost in the ocean; but the strongest part follows the convex extremity of the Bank, and continues to set along the western edge of it to the north-westward directly towards the Cape of Good Hope. This north-westerly current seldom exceeds half the velocity of that setting to the south-westward, on the other side of the Bank.

Easterly or counter current.

An Easterly, or counter current, often prevails outside of the regular stream, that sets along the edge of the bank to the westward. This easterly current is frequently experienced in lat. $36\frac{1}{2}$° to 40° S., about 2 degrees from the eastern part of the Bank contiguous to Algoa Bay, between lon. 26° and 30° E.: and it sometimes extends to lat. 36° or $35\frac{1}{2}$° S. within about 20 leagues of the Bank.

* Keeping nearly in lat. 36° S. outward-bound in June 1802, the wind strong at westward, we had a very weak current against us in passing the Bank of Agulhas, only from 10 to 20 miles per day.

From the 17th to the 20th April, 1799, we had in the Anna a strong current to the S.E. in lat. 36° S., lon. 27° and 28° E.; and did not perceive any set to the westward, until in lat. 35° S., then near the verge of soundings.

In July, 1792, the Thetis was in 24 hours set 38 miles to the eastward by a current, in lat. $36\frac{1}{2}$° S., lon. $28\frac{1}{2}$° E. This ship had, in the same latitude and longitude, a stronger current to the eastward, on her preceding voyage; and also on her first voyage, a little farther to the southward, in the same longitude. The sea was much agitated at these times.

Nov. 28th, 1800, at noon, the Sir Edward Hughes was in lat. $39\frac{1}{2}$° S.: on the subsequent noon in lat. $38\frac{3}{4}$° S., lon. 26° E., the current having set N.N.E. $\frac{1}{4}$ E. 54 miles during the 24 hours.

In Feb. 1798, we kept mostly in 40° and 41° S., from the meridian of Cape Agulhas to the meridian of the S.W. part of Madagascar; had in general a daily set of from 20 to 30 miles eastward; and at two different times, 60 miles in 24 hours. From the meridian of Cape Agulhas, to the meridian of Cape St. Mary, we had 4° of easterly current in 10 days, with variable winds from every quarter, but strongest from the westward.

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# WINDS, WEATHER, AND DOUBTFUL DANGERS, WITH REMARKS ON ICE ISLANDS NEAR THE BANK OF AGULHAS.

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## WINDS AND WEATHER.

FROM September to April, which is the summer season, the S.E. winds may be said to predominate in the vicinity of the Cape of Good Hope, and N.W. and westerly winds from April to October, which is the winter or stormy season. But it must be observed that the S.E. winds are more constant on, and near the Bank of Agulhas, during part of January, the whole of February and March, than at any other time of the year. In April also they are expected, though in this month short gales from the westward frequently happen. In May, the winds between N.W. and S.W. prevail more than the S.E. and easterly winds; sometimes blowing in hard gales along the edge of the Bank. In June, these westerly and N.W. are strong: during this month, and July, and August, they blow with greatest force, producing very high seas; and were it not for the help of the westerly current setting along the edge of the Bank, ships would find it very difficult to get round the Cape in these months. All ships from India, which, on their passage to Europe, reach the eastern part of the Cape Bank from April to September, should be in good condition if possible, and well prepared to resist bad weather; for they will be liable to encounter storms from W.N.W. to W.S.W., which may continue two or three days at a time, with short intervals of easterly and variable winds. Many ships, by not being in condition to resist these gales, have sprung leaks, and have been obliged to bear away for St. Augustine Bay, in Madagascar, to repair

Periodical winds.

their damages;* several have anchored in the Bays to the eastward of the Cape in great distress; others have reached Simons Bay with much difficulty, where they repaired their damages, and refreshed their crews, worn out with fatigue.

Westerly gales.

In August, the westerly winds blow not so constant as in June and July, although very hard gales of short duration may be expected. On the 4th of August, 1801, we were in the Anna, near the eastern part of the Bank abreast of Algoa Bay, and got round the Cape of Good Hope on the 14th, having encountered a very severe storm of two days' continuance from W.N.W. and West, in lon. 24° E. Westerly winds are also frequent in September, October, and November; and even in December ships have been beating round the Bank against westerly winds during the whole month, before doubling the Cape. They had sometimes very severe sudden squalls; but in general westerly gales are of short duration in this season, although they blow very strong at times.

Of ships rounding the Cape in winter.

Notwithstanding what has been mentioned above relative to winds, it sometimes happens that ships get easily round the Cape Bank to the westward in every month of the year; many have been known to get round in May, June, July, and August, more speedily than others in November and December; for the winds are often different in one year from what they are in another, even in the same month.

Course of the winds.

Around the Cape Bank, as in the open sea far to the S.W., S.E., and southward of the Cape, the winds in changing follow the course of the sun, seldom veering from North to East, &c.; but mostly from N.W. to West, S.W. and South. After blowing strong from N.W. or West, if the wind veer to S.W. and southward, it becomes light, or is succeeded by a calm. If a light breeze continue, it veers to the south-eastward, where it may keep fixed for a considerable time, but probably not above a day, if it be the winter season. From S.E. it veers to East and N.E., then to N.N.E. and North. In the vicinity of the Bank, the N.E. and northerly winds are very transitory, but in lat. 39° and 41° S. from the meridian of Cape Agulhas to lon. 45° or 50° E. the north-north-easterly winds are often experienced in both seasons, and sometimes blow steady for a day or two at a time.

Indications of westerly gales.

There are sometimes N.W. or westerly gales, near, and upon the Cape Bank, which blow very hard, with a clear sky; but those most to be dreaded are generally preceded by heavy black clouds rising from the N.W. and West, with sometimes lightning issuing from them, or a noise of distant thunder; shortly after, the gale may be expected to commence by sudden gusts, and sometimes heavy showers of hail, or whirlwinds from the heavy dense clouds.

Cautions of the Dutch.

When the wind at S.E. or E.S.E. shifted to N.E., the Dutch commanders were directed by the company to take in the mainsail. If lightning appeared in the N.W. quarter, they were to wear and shorten sail; for in the first case, they expected a hard gale at N.W.; and if lightning was seen in that direction, they thought the gale would commence in the sudden shift, or whirlwind, which might be fatal if they were taken aback.

The barometer.

The Marine Barometer is of great utility in announcing the approach of storms near the Cape Bank, by a considerable fall of the mercury. A careful attention to this instrument, combined with the knowledge which every navigator ought to possess, by observing the appearance of the atmosphere, the surface of the sea, or the heavenly bodies, will be sufficient to warn him of the approach of these storms. Although a fall

* Several ships have perished in these gales: the Princess of Wales, with her crew and passengers, in a fleet homeward-bound from India, also the Ganges, and probably the Skelton Castle, the William Pitt, the United Kingdom, and other ships.

of the mercury generally precedes a gale of wind in these latitudes, it is seldom disturbed by hard squalls of short duration.

In the vicinity of the Cape Bank, and in most parts of the southern hemisphere, the mercury rises with southerly and falls with northerly winds; these proceeding from a warmer atmosphere are more rarefied, consequently the mercury falls in the barometer, whereas southerly winds coming from the frozen regions near the pole are more dense, and cause the mercury to rise. This ought to be kept in remembrance; for when the wind was from S.E., I have several times observed the mercury to fall considerably before it changed to the northward, and expected a gale; but the fall resulted only from the warmer air coming in contact with, and repelling the former.

From the Cape Bank to the meridian of the South end of Madagascar, hard gales of wind happen in the winter season, accompanied with lightning, thunder, and much rain; which sometimes prove very dangerous to ships, particularly near the land. Gales to the eastward of the Cape Bank.

The Britannia and Bombay Castle, homeward-bound at different seasons, were struck by lightning off the Cape; the latter ship was near the land at Algoa Bay, in company with a fleet. These ships had each her foremast set on fire by the lightning, which penetrated from the head to the centre, bursting out in that part, and could not be got under; the Britannia was lying to, at the time, in a storm. Both ships were fortunately saved by cutting away their foremasts, which fell clear of them in a body of fire.*

In the storms off the Cape Bank, and to the eastward, the sea is turbulent, and they are generally accompanied with a black overcast sky. When they are about to commence, and during their continuance, numbers of albatros, peterels, and other oceanic birds, are seen flying about; although, in moderate weather, few are perceived, for at this time they rest on the surface of the sea to fish, which they cannot do in a storm. Birds seen before and during storms.

## DOUBTFUL DANGERS.

CANNING BANK (perhaps doubtful), stated to have been discovered by the ship George Canning, Captain James Clark, September 19th, 1827. At 3 P.M. steering S.E. by E., the sea appeared discoloured, as if in soundings, lat. 39° 40′ S. the preceding noon, lon. 26° 43′ E. by lunar observations on the 15th brought forward by chronometer. The water had previously appeared more discolored at 8 A.M. Hove to at noon, and sounded in 88 fathoms very fine sand with some reddish and black specks; and there was probably less depth at 8 A.M., but did not then sound. At 5 P.M. got soundings again 100 fathoms hard rocky bottom with rotten ground, the sea at this time having nearly resumed its dark blue colour. Saw the Islands Amsterdam and St. Paul, October 5th. The chronometer then appeared to be 10 miles East, and the lunars 1 mile west of the position assigned to those islands. Canning Bank.

TELEMAQUE SHOAL, doubtful, said to have been discovered by Captain Telemaque Shoal.

* The Thames, a small ship from Bengal, was near the edge of the bank, in lat. 35° 15′ S., lon. 25° E., November 30th, 1801. She had then strong gales at westward, hard squalls, hail showers, a high sea, and much lightning all round. At 7 A.M., with a sudden explosion, several fire-balls were seen to strike the ship, when sending down top-gallant yards. Two men were thrown from the main-top-mast head into the sea, and perished: one thrown from the main-top on deck, and two much scorched in the top. One was killed in the fore-top by the lightning, and one man much scorched on deck; the fore-topsail yard it also set on fire. Hail showers and hard squalls at the time. The Company's ship Macqueen, May 16th, 1829, in lat. 37° S., lon. 17° E., had her main-top-gallant mast struck by lightning, which tore that and the top-mast in pieces, filled the deck with sulphureous smoke, and knocked down several of the people at dinner, but none of them were seriously hurt.

Geraud, 22d January, 1786, in the French brigantine, Telemaque, bound to Madras, who, with his passengers, were firmly of opinion that they had passed over a dangerous coral shoal of great extent, having, apparently, not more than 2 fathoms on some parts of the rocks; but they did not sound, owing to the anxiety of considering themselves in imminent danger at the time.

This supposed danger they made in lat. 38° 11′ S., lon. 21° 57′ E. by *account;* but its corrected situation was supposed to be lat. 38° 50′ S., lon. 22° 2′ East of London.

The following discordant positions have been assigned to the Telemaque Shoal, by different ships which have seen apparent dangers, since the existence of that Shoal was first reported.

Discoloured water in lat. 39° 9′ S., lon. 23° 24′ E., seen by the Crown Prince Frederick, in 1796.

Discoloured water extending as far as the eye could reach, in lat. 38° 5′ S., lon. 22° 58½′ E., seen by the American ship, Pallas, in January, 1807.

This apparent danger seems also to have been seen by the brig Macedon, in May, 1816, who made it in lat. 38° 0′ S., lon. 22° 54½′ E. by sun and moon; it appeared to consist of several patches of breakers, one of which seemed extensive, and soundings of 90 to 40 fathoms were said to have been obtained when near them.

It is satisfactory for navigators to know, that they have no longer any cause to apprehend danger on the supposed Telemaque Shoal; for although it is said to have been seen by several ships, as stated above, H.M.S. Heron, Capt. Hanmer, was employed in endeavouring to discover this shoal, and its *non-existence* has been published in the Government Gazette at the Cape of Good Hope, in a letter from Capt. Hanmer to Capt. F. Moresby, senior officer there at the time of the Heron's return.

Appearance of an extensive shoal in lat. 33° 56′ S., lon. 36° E., no part of it above water, seen by the Otter sloop of war, in November, 1810.

The Brunswick thought soundings of 85 or 95 fathoms were struck in lat. 37° 20′ to 37° 30′ S., lon. 36° 19′ E.

A rock 20 yards in length, and 6 feet above water, surrounded by a sand-bank, with breakers, as far as the eye could discern from the top-mast-head, in lat. 35° 23′ S., lon. 41° 29′ E. by chronometer, and 41° 12′ E. by lunar observations, was supposed to have been seen in the American ship, Union, in July, 1812.

A Dutch officer, in October 1795, stated that he discovered a shoal in lat. 31° 44′ S., lon. 44° E. by estimation, upon which he had soundings, the sea running high and confused; and the water appeared shoal, with breakers to the northward.

Soundings thought to have been struck in H.M.S. Belliqueux, August, 1801, ground 80, then 132 fathoms, in lat. 28° 43′ S., lon. 42° 50′ E. by ☉☽, and 42° 26′ E. by mean of seven ships' chronometers. Three ships of the fleet sounded at the time, but got no ground at 110, 150, and 170 fathoms.

A shoal in lat. 37° S., lon. about 52° E., is said to have been seen by the American brig, Atalanta. This shoal is also said to have been seen by the Dutch ship, Samarang, in August, 1818, and stated to be an extensive reef under water, with some pointed rocks above surface of the sea on its western part, situated in lat. 36° 44′ S., lon. 51° 52′ E.

Slot Van Capelle Shoal. The Slot Van Capelle Shoal, or Dutch Shoal, said to have been seen by Capt. Jacob Bows in the ship of this name, in 1746, with *breakers on it*, and soundings of 62 fathoms grey sand to the S.W. about 4 or 5 leagues, has had various situations assigned to it, viz. lat. 38° 24′ S., lon. 38° 50′ E., lat. 37° 24′ S., lon. 38° 50′ E., lat.

38° 20′ S., lon. 43° 30′ E., lat. 36° or 36½° S., lon. 41° E., and lat. 40° S., lon. 43° 30′ E.

The last position but one, *viz.* lat. 36½° S., lon. 41° E., assigned to Slot Van Capelle Shoal, nearly corresponds with the following account transcribed from the journal of Capt. William Bennett, who was an officer in the ship Atomatia, when she got soundings *apparently* on that shoal.

"May 16th, 1801, strong W.N.W. winds, steering East at the rate of 10 and 11 knots, came suddenly into a smooth sea at 10 P.M., and supposing we were in soundings, hove to, got ground 82 fathoms, small glittering shells and gray sand. Steered East by compass 4½ miles, and at ½ past 10 sounded again in 62 fathoms, small white shells and sand, with black specks. Steered five miles N.E. by compass, and at half-past 11 P.M. again sounded with 120 fathoms line, but got no bottom. We supposed ourselves to be on the Dutch bank."

At noon observed, lat. 36° 11′ S., from which time computing the run back to ½ past 10 P.M. when they sounded in 62 fathoms, would place that part of the bank in lat. 36° 30′ S., or 36° 35′ S., and in lon. 43° 43′ E. by dead reckoning, carried on from the Island Trinidad, seen on the 21st of April. But they had an observation of the sun and moon for the longitude on the 6th of May, from which, computing the run to the 16th at ½ past 10 P.M. will place that part of the bank thought to have 62 fathoms on it, in lon.* 41° 8′ E., or 2° 35′ West of its situation by account from Trinidad.

Notwithstanding the above account, the existence of the Slot Van Capelle Shoal seems still very doubtful.

A French ship is said to have passed close to breakers in lat. 38° 8′ S., lon. 43° 6′ E. of London by account, on her passage from Marseilles to the Island Mauritius, in 1788. French shoal doubtful.

Spots of discoloured water were seen in the ship Wellington, 9th January, 1817, in lat. 39° 53′ S., lon. 71° 43′ E., with apparently 8 to 10, or 12 fathoms water over them, resembling coral shoals; she sailed 7 miles among these patches, which were separated from each other about one or two hundred yards, and none of them appeared above 60 or 70 yards in diameter. She did not sound, as it blew a gale whilst running through amongst these patches, with an officer on the topsail-yard to direct the course; afterwards she got into clear water, and soon lost sight of them.

There is a great probability that the exuviæ of fish, patches, and beds of spawn, dead whales, or part of the wrecks of ships, which are not unfrequently seen floating on the sea in these latitudes, during the summer months, have been mistaken at times for banks, shoals, or rocks near the water's edge; for some of these patches are of a reddish † or brown colour, others resemble saw-dust, and might easily be mistaken for sand-banks. The supposed rock seen by the American ship Union might probably have been a dead whale, surrounded by a bed of fish-spawn resembling a sand-bank, with ripplings like breakers extending from it, occasioned by a collision of currents, which phenomenon has deceived many navigators. It may, however, be prudent to keep a good look-out, when near any of the situations described above, although the existence of most, or even any of these dangers, appears to be very doubtful.

Fishes of uncommon size, seen at times in the Southern Ocean, may be mistaken

* This is nearly the longitude of the shoal said to have been seen by the Union as stated above, but upwards of a degree farther to the South.

† When the water in some of these reddish patches is taken up and examined by the microscope, it is sometimes found to contain minute cray fish and other young fry.

for dangers; an instance of this happened to the ship Hercules, in June, 1816, as may be perceived by the following extract from her journal.

At $2\frac{1}{2}$ P.M. the man at the mast-head said he saw a rock on the larboard bow, which was thought to be the Slot Van Capelle Shoal, as we were looking out for it; the weather being fine, steered towards it to have a good view. About $2\frac{3}{4}$ P.M. another was seen about 2 miles on the starboard bow, and we appeared to be passing between them; shortly afterwards, to our astonishment, saw one right a-head, not far from us, and while in the act of hauling away from it, we observed it disappear suddenly, shewing an immense fish's tail as it descended below the surface of the sea. The ship no doubt had disturbed it, as it lay without motion before we got close, the sea then making a small break on the head or fore part of the body of the animal, which was about 16 feet above water, and about 30 feet in circumference, of a white gray colour, covered with a mixture of barnacle, sea-weed, &c., like a wreck that had been long in the water. The length could not be determined, but it must have been great, by the appearance of the discoloured water over the animal. If we had not got suddenly close to it, we should positively have declared that we had seen *rocks above water*, about a mile distant from each other, as these huge animals lay without motion, part of them about 16 feet above water, and the sea breaking upon them.

It is much to be regretted, that modern navigators have reported so many dangers to the southward and eastward of Cape Agulhas, without having examined any of them, leaving their existence in great doubt. Whereas, in none of the Journals of the Company's ships, during the 17th and part of the 18th century, is there any notice of dangers supposed to exist in those seas.

## ICE ISLANDS.

Ice Islands.

ICE ISLANDS, usually called ICE-BERGS, have sometimes been mistaken for land by ships which went far to the southward; such probably were Denia and Marseveen, two small islands placed near each other in some old charts in lat. 41° S., lon. 21° 30′ E., as no land is thought to exist near that situation.

Proceeding towards India in the Carron, in February, 1798, we went in lat. $42\frac{1}{2}$° S. in search of westerly winds, where the atmosphere became very cold, with almost constant fogs and sleet, the sea being covered with snow peterels, indicating that we were not far from ice; we were therefore glad to return into lat. 40° and $39\frac{1}{2}$° S., where we got speedily to the eastward.

Ships bound to New South Wales should be careful not to proceed too far South, in running down their easting, for on December 24th, 1789, at half-past 8 P.M., H.M.S. Guardian, bound outward to that place, with stores, struck against an ice island* in a foggy night, in lat. $44\frac{1}{4}$° S., lon. $44\frac{1}{2}$° E., by account. She soon after nearly filled with water, and the chief part of the crew left her in the boats; but Captain Riou, and a few of the people, remained in the ship and suffered great hardships; she continued nearly full of water, and was tossed about a considerable time without a rudder, until she was discovered by a Dutch packet, and towed into False Bay at the Cape of Good

* From another ice island, one-half higher than the ship's top-gallant mast head, the boats had previously, at 5 P.M., procured a load of ice for fresh water. The weather became very foggy at $\frac{1}{2}$ past 7 P.M., and although a good look-out was kept, the ship struck as mentioned above, and after striking hard several times, a gust of wind came through a gully in the ice island, took the sails aback, and cleared her from the ice, with the loss of rudder, and otherwise greatly damaged. Had she remained any longer striking against the lacerating front of this frightful mountain of ice, she must have immediately been dashed to pieces.

Hope, five weeks after this misfortune; where she was wrecked, by driving on the shore, with several other ships, in a storm.

Ice Islands seldom or never have been seen by the Company's ships when passing the Cape Bank in the parallels of latitude from 36° to 41° S., yet it will be perceived, by the account of two ships, now to be narrated, that the phenomenon of dangerous Ice-bergs having been discovered near the Cape of Good Hope, almost in the warm temperature of the verge of current that sets to the westward along the bank, is proved beyond any doubt; and shewing, that greater caution is necessary than hitherto supposed, for it seems very probable, that some missing ships have been lost by striking against Ice-bergs in the night, during tempestuous weather.

The French ship, Harmonie, Captain Milchior, from Calcutta, bound homeward, on April 7th, 1828, fell in with several clusters of Ice-bergs in lat. 35° 50′ S., lon. 18° 5′ E. of Greenwich, some of which appeared to be 100 feet above water and 200 feet in diameter. She passed between two of them about two cables' lengths from the nearest large pieces of ice, upon which the sea broke violently. When among these Ice-bergs, she spoke the Spanish ship Constancia, from Manilla, bound to Cadiz; and after the latter ship arrived at Cadiz, the following description appeared in the Diario Mercantel, by the pilot of the Constancia:—"April 7th, 1828; at $10\frac{3}{4}$ A.M. saw a small island, which, from the deck, appeared like a white cloud, and some shadowy lines were afterwards observed in it, as is usual in land. At 11 A.M., having approached nearer, it appeared to be a large island of considerable height, divided into two summits: soon after, three other small islands were discovered bearing North, at a short distance from the former. At $11\frac{1}{2}$ A.M. we perceived they were white, and that the light of the sun was reflected from their surface as from a mirror, whilst in those places where the sun did not shine, there were shadows as are seen in distant land. We remained perplexed with this phenomenon* till noon, then found we were in lat. 35° 56′ S., lon. 17° 59′ E., of Greenwich, by chronometer, corresponding with lunar observations taken on the preceding day. At this time the islands bore N. 78° W., distant 7 or 8 miles; sounded but got no bottom at 135 fathoms, and the sea continuing of a green colour, we concluded these were Ice-bergs, which had drifted to lat. 35° $54\frac{3}{4}$′ S., lon. 17° $50\frac{1}{4}$′ E. Steered W.S.W. till 2 P.M., and spoke the French vessel, L'Harmonie, from Calcutta, which had been visible since daylight. We then proceeded W.N.W. with a N.E. and N.N.E. wind, leaving the French vessel behind, and at $3\frac{1}{2}$ P.M. discovered two other Ice-bergs, which we passed on the North side at $1\frac{1}{2}$ P.M., having run 13 miles since 2 P.M. The most southerly of these presented a square of 25 or 30 toises of elevation, but without an apex like the other near it: at the distance of 3 miles to the North of these, another Ice-berg of large size appeared. The French vessel passed between the first and the other which lay W.S.W. of it, and which seemed almost breaking up, as the surface of the surrounding sea was covered with small pieces of ice; some time after, in the dusk of the evening, we passed another Ice-berg, almost dissolved. The wind turned to N.N.W. and N.W. in the night, and blew tempestuously all the following day, without any more ice being seen."

The brig Eliza, Captain Jucometti, from Antwerp, bound to Batavia, on the 28th April, 1828, fell in with five floating Ice-bergs in lat. 37° 31′ S., lon. 18° 17′ E. of Greenwich, having the appearance of church steeples, and apparently from 250 to 300 feet high, which were passed within a $\frac{1}{4}$ of a mile; and the sea broke so furiously

* The magical appearance that an Ice-berg sometimes exhibits by the radiance of the sun, when viewed at a considerable distance, possibly might have been experienced by some of the early navigators when passing the Cape of Good Hope, and thereby have arisen the fable of the *Flying Dutchman*.

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against these enormous masses of ice, that at first they were thought to be fixed on some unknown shoal, but on sounding, no bottom could be found.

These Ice-bergs were seen by the Eliza, three weeks after the Harmonie and Constancia fell in with Ice-bergs in a state of rapid dissolution, nearly on the same meridian, but 33 leagues more to the northward: these could not however have been the same masses of Ice, although probably they all were the production of the same cause, and were carried from the same place by the current: those seen by the Eliza seem, nevertheless, to have been about a month later in reaching the same parallels of latitude than those seen on the 7th April by the above-mentioned ships.

The whole of these Ice-bergs were probably drifted by northerly currents, and south-westerly winds and swell, from some extensive tract of land, which was long supposed, and is now found to exist in a high latitude, to the southward of Bouvet and Thompson's Islands, and farther to the eastward than Sandwich Land. But it is rather remarkable that these Ice-bergs were seen in April, which is the autumn of the southern hemisphere; whereas, in March and April, which are the spring months of the northern hemisphere, the arctic or northern Ice-bergs are usually observed, in the North Atlantic Ocean, to drift farther to the southward before they are dissolved, than at any other time in the year.

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# FROM THE CAPE OF GOOD HOPE TOWARDS BASS STRAIT.

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## ISLANDS IN THE SOUTHERN OCEAN—SOUTH COAST OF AUSTRALIA—WINDS AND CURRENTS.

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### ISLANDS IN THE SOUTHERN OCEAN.

Bouvet Island. BOUVET ISLAND, OR CIRCUMCISION, was seen at different times, in 1808, by the Swan and Otter, vessels belonging to Messrs. Enderby, and employed in the Southern Fishery.

The Swan, Captain Lindsay, on the 6th October, 1808, discovered high land, and from this time till the 11th, they made every effort to get close to it, without being able to get nearer the land than 3 miles, on account of a mass of solid ice surrounding it, and the land itself was covered with snow.

Their situation was rendered very perilous at times, the vessel being beset with loose masses and islands of ice, in dark blowing weather, which forced them to depart from this inhospitable place on the 11th October.

The observations taken in the Swan make this island in lat. 54° 16′ S., lon. 6° 14′ E.; it appeared about 5 miles in extent East and West, and the West end, which is very high land, Captain Lindsay called Dalrymple Head. This must be

the Cape Circumcision of Mons. Bouvet, discovered by him January 1st, 1739, and placed in lat. 54° 8′ S., lon. 11° 10′ E. Captain James Cook could not find this land, although he got into its parallel considerably to the westward of the meridian assigned to it by Bouvet, and he appears to have passed about 6 or 8 leagues to the southward of its situation as determined by Captain Lindsay. Our celebrated circumnavigator was therefore of opinion, that Mons. Bouvet had mistaken ice islands for land; but the existence of this island, and another island in its neighbourhood, has been proved beyond all doubt, by the following observations taken from the journals of the Sprightly and Lively, southern whalers, belonging to Messrs. Enderby.

There is reason to believe, that no person ever landed on Bouvet Island until Dec. 16th, 1825, when a whale boat from the Sprightly landed, and took formal possession of it in the name of King George the Fourth, and named it Liverpool Island, but the name of its first discoverer, Bouvet, ought not to be transferred. The Sprightly fell in with this island December 10th, and from this date till January 24th, 1826, this vessel and the Lively, her consort, remained in its neighbourhood, having a boat's crew on the island great part of this time, endeavouring to obtain the fur seal skins; but very few were procured, the only place where they could land being at the S.W. end of the island, called by Captain Norris Seal Point. This island appeared to extend North and South about 3 or 4 leagues; the North end high and rugged, the South end low; the middle high, covered with snow, and may be seen 12 or 14 leagues in clear weather. It was observed to be of volcanic origin, the surface like a cinder, containing large veins of transparent black lava, some of them interlaid with white streaks. Except at the south-western end, the island presents a steep, inaccessible, rocky coast, but soundings of 35 to 20 fathoms black sandy bottom were got on the South side of it, about a mile off shore.

A small rock lies off the S.E. end of the island; and a high pyramidal rock bears N.W. by W. about 6 miles from its N.W. end, which was at first mistaken for an Ice-berg, it being cased with ice: many other rocks around the island were also observed to be cased with ice, and had been mistaken for Ice-bergs; the N.W. side of the island is the most dangerous part, being fronted by many perpendicular rocks, and small ice.

Bearings of the island, and its estimated distances at noon, on ten different days, when the latitude was observed, are inserted in the Sprightly's log-book; these noon observations, the least and the greatest, giving 15 miles difference in the latitude of the island, but the mean result of the ten days' observations places the body of Bouvet Island in lat. 54° 21$\frac{3}{4}$ S., and the mean of five days' observations by chronometer will place it in lon. 5° 24′ E.; the amount of difference of the longitude given by chronometer for the island during these five days being 60 miles. The mean of Captain Lindsay's observations, and those of Captain Norris, would place Bouvet Island in lat. 54° 15$\frac{1}{2}$′ S., lon. 5° 37′ E., which differs not much from the mean approximation given above. *Approximate position.*

THOMPSON ISLAND, discovered December 13th, 1825, by the smack Sprightly, Captain George Norris, with the Lively in company, was found to be rather low, and it appeared of small extent, the sea breaking upon it with great violence. Three rocks, named the Chimneys, lie 4 or 5 miles to the south-eastward of Thompson Island; and another small rock about 3 miles to the southward of the Chimneys. Captain Norris describes Thompson Island to be in lat. 53° 56′ S., lon. 5° 30′ E., and bearing from Bouvet Island N.N.E., distant about 15 leagues; but he states the latter island *Thompson Island.*

to be in lat. 54° 15′ S., lon. 5° E., which, if correct, would make the distance considerably less between these islands; not above 8 leagues.

If Thompson Island bears N.N.E. 15 leagues from Bouvet Island, as stated by the navigator named above, then, by the approximated geographical situation of Bouvet Island, the former would be in about lat. 53° 40′ S., lon. 5° 33′ E. But if it is only 8 leagues from Bouvet Island, in this case, Thompson Island would be in about lat. 53° 58′ S., lon. 5° 28′ E.

Weather.

In December and January, the Sprightly and Lively experienced very stormy weather in the neighbourhood of these islands. Although the wind was moderate at times, with a glimpse of clear sky, yet the fogs and strong gales came on so suddenly, as to prevent a boat being sent from the vessels with safety, and Bouvet Island was usually enveloped in fog clouds. Almost constant hard gales prevailed from the westward, with a high sea, and the current setting to the eastward, by which the vessels were often driven from the island; and their danger was increased, by numerous Icebergs, and loose pieces of ice, with which they were almost daily embarrassed.

These vessels went afterwards in a south-westerly direction, as far as lat. 60° S., without discovering any other land, and could not penetrate farther to the southward, on account of a solid field of ice.

Prince Edward Islands.

PRINCE EDWARD ISLANDS, two in number, were named by Captain Cook, who passed through the channel between them in December, 1776, and found it about 5 or 6 leagues broad and very safe. These islands are high, and were then covered with snow, and the largest was thought to be about 15 leagues in circuit, the body of it being in lat. 46° 53′ S., lon. 37° 46′ E., the other in lat. 46° 40′ S., lon. 38° 6′ E., and about 9 leagues in circuit.

These islands afford no place of safe anchorage, although they are sometimes visited by English or American vessels employed in the seal fishery, but seals here are very scarce.

Crozet Islands.

CROZET ISLANDS, five in number, were discovered by the French navigators, Marione du Fresne and Crozet, in 1772, but their positions are not correctly known. They are said to lie from 9° to 12° to the East of Prince Edward Islands, nearly in their parallel, and that the two easternmost islands lie a little more to the southward, and farther to the eastward. The Princess of Wales, schooner, of London, whilst sealing here, was driven on the rocks by a heavy swell, and wrecked, March 18th, 1821, and her crew, consisting of fourteen persons, remained on these barren islands until the 22d January, 1823, when the Philo, an American schooner, on a sealing and trading voyage, fortunately touched here, and took them from a state of severe suffering, which they had endured nearly two years. Mr. C. M. Goodridge, who belonged to the schooner when she was wrecked, has published a narrative of their misfortunes, and he states that the three westernmost of these islands lie in about lat. 48° S., and about lon. 48° E. The two smallest, distant about 30 miles from each other, are not above 6 or 8 miles in circuit. The largest of the three is about 25 miles in circumference, distant about 30 miles from one of the smallest islands, and about 12 miles from the other, these three islands forming an irregular triangle. The two easternmost of Crozet Islands are said by Mr. Goodridge to lie in lat. 46½° S., and about lon. 49° E., distant about 11 miles from each other, and 50 or 60 miles to the eastward of the three westernmost islands.

There is a reef of rocks 4 or 5 miles to the leeward or eastward of the largest of the

last-mentioned islands, which is particularly dangerous, as vessels would naturally look for shelteer on that side of the island. These and Prince Edward Islands have been sometimes visited by the southern fishers, in search of seals or sea-elephants ; but as they are destitute of any harbour or place of shelter, the landing difficult, and the weather often tempestuous, they are not now frequented by sealing vessels.

KERGUELEN ISLAND, discovered by the French navigator of this name, called by Captain Cook DESOLATION, is the largest of the islands in this part of the Southern Ocean ; it was frequented by English and American fishers, several of whom used to remain many months there, preparing seal skins and oil, which they collected from the numerous herds of seals and sea-elephants that basked on the shores ; but these animals are now very scarce, having been nearly exterminated. Kerguelen Island.

Cape Louis, the western extremity, is in lat. 49° 3′ S., lon. 68° 20′ E. ; Cape Digby, the East point, in lat. 49° 23′ S., lon. 70° 33′ E. ; Cape George, the southern extremity, in about lat. 50° S., lon. 70° 10′ E. ; and Cape François, the northern promontory of the island, is in lat. 48° 40′ S., lon. 69° 4′ E. This Cape forms the North side of Christmas Harbour, which has 45 fathoms water at the entrance ; 16 fathoms farther in, and near the bottom of it good anchorage, in 8 fathoms black sand, where ships are sheltered from all winds, the harbour being only open to two points of the compass, and these covered by the islands in the offing. The South point terminates in a high rock, which has an arched passage through it, and which is a good mark for distinguishing this harbour. There are several bays on the coast of Kerguelen Island, with many rocky shoals and islets, which render the approach to the shore dangerous in some places. At a small distance from the N.W. extremity lies a group of small isles, the northernmost of which, called Bligh's Cap, is a high barren rock, in lat. 48° 29′ S., lon. 68° 40′ E. The tides here are considerable. Bligh's Cap.

ENDERBY* LAND, discovered, in 1831, by Captain John Biscoe, in the brig Tula, belonging to Messrs. Enderby, during a sealing voyage, appeared to be the northern limit of an extensive tract of land, which may probably stretch far southward beyond the antarctic circle. Enderby Land.

The central part of the coast seen was observed to be in lat. 66° S., lon. 49° or 50° E., and the western part in about lat. 67½° S., lon. 44° E., extending in an E. N. E. direction to about lat. 64½° S., lon. 52½° E. Captain Biscoe traversed along the above-mentioned limits from West to East, as near as the ice would admit, which then, in January, formed an impenetrable barrier, precluding a close approach or the means of getting a boat through the ice to this land, which appeared almost sealed up with ice and snow.

ST. PAUL† is the southernmost of two islands situated nearly on the same meridian, distant from each other about 17 leagues ; the Dutch navigator, Vlaming, who examined these islands in 1697, called the northernmost Amsterdam, and the other St. Paulo, which is better known and more accessible than the former, and may be St. Paul Island.

* The Messrs. Enderby have always been liberal in promoting physical and geographical science, by giving instructions to the commanders of their vessels to make every endeavour for the discovery and exploration of land about the antarctic circle, and to penetrate as far South as possible with the same view, without limitation of time or expense.

† There appears to be an uncertainty respecting the right application of the names to this and the neighbouring island. Most of our more recent charts give the name of St. Paul to the northern, and of Amsterdam to the southern island.

seen about 20 leagues distance in clear weather. It extends about 8 or 10 miles N.W. and S. E., and is about 5 miles in breadth, having a level aspect, and sloping down at each extremity when bearing to the N. E.

On the East side of the island there is an inlet to a circular basin, through which the sea ebbs and flows over a causeway at its entrance. A head-land appears on each side the entrance, and a rock 80 or 90 feet high, resembling a nine-pin or sugar loaf, stands at a small distance from the shore on the northern side. Abreast of the basin, there is good anchorage in 21 or 23 fathoms black sand, like wet gunpowder, about a mile from the shore, where ships are sheltered from westerly winds. This is the only safe anchorage; in other parts the bottom is rocky, with deep water near the shore, and, from the western extremity of the island, a reef, on which the sea breaks, projects to a considerable distance.

Anchorage.

One of the vessels that frequented this island for the seal fishery was driven on shore from her anchors and wrecked, by a sudden shift of wind; ships, therefore, ought to avoid this anchorage, if there be the least indication of an easterly wind.

Mr. Cox, in the ship Gustavus, 30th May, 1789, anchored in 20 fathoms black sand, with the S. E. point of the island S. W. by S., distant 2 miles; the N. E. point N. ½ W. 2 miles, entrance into the basin W. by N. 1¼ miles, Sugar-loaf W. N. W. 1 mile, which was nearly in the spot where Vlaming anchored in 1697.

With some difficulty the cutter got over the bar of the entrance into the lagoon, as the tide was running out of it about 2½ knots, being then ½ ebb. Long coarse grass obstructed their ascent to the top of the hill, in order to look for fresh water, where it was thought Vlaming found it; but although fresh water had been discovered there, it would have been very difficult, if not impracticable, to have watered the ship; for present expenditure it might, however, be valuable to any vessel that intended to remain at the island for a considerable time.

Basin.

In rowing round the basin, smoke was observed to issue from several places among the stones close to its verge, and a pocket thermometer which stood at 62° in the open air, rose to 190° when immersed in the water, and then in about a minute fell to 185°; and this was found to take place in several of the hot springs, at different parts of the basin. Sometimes, in the same hole, the thermometer fell from 185° to 182°, and rose again to 187° or 188°. Our people, who were on shore sealing, constantly boiled their dinner of fish in some of the springs, which are in all parts close to the basin, mixing with its waters in some places, and heating them to a considerable extent. And as the basin abounds with fish, and no art is required to catch them, one of the boys, in five minutes, caught a sufficiency for our whole party to eat, so that, as Vlaming says, you may really throw the fish fastened on the hook, out of the cold into the hot water, and boil them.

Hot Springs.

June 1st.—The weather being clear at day-break, saw from our anchorage the Island Amsterdam, bearing by compass from N. 10° E. to N. 22° E.

June 5th P.M., blowing hard from N. E. with a great swell, we resolved to put to sea, and run under lee of the island: at five, got a spring on our cable to cast, cut it close to the splice, and went to sea.

Anchorage.

We lay in a good berth to clear the island on either side, but it would be safer for a large ship to lie about two cables' lengths farther to the eastward, and at the appearance of blowing weather from this direction, to put to sea immediately, and run to leeward of the island, where smooth water will be found; and as the easterly wind is never of long continuance, she would soon regain the anchorage.

There is not a shrub on the island, coarse grass and reeds being the only verdure

seen: a sort of turf composed of the decayed fibres of the grass and reeds, burnt very well.

During our short stay here we killed 1,200 seals; many whales were constantly playing about the ship, said to be of the spermaceti kind, by several of our people who had been in Greenland.

In the basin we caught bream, some red perch, and a fish resembling a tench. Those caught on board were generally a sort of bream, striped like a mackerel; of these, so many were caught the first day, that besides salting and pickling several barrels, we threw some hundreds over board. The instant fish are caught, they should be gutted and salted; if exposed to rain before they are salted and packed, they will perish, as we experienced. Fish.

The ship Clyde, Captain Blair, in October 1820, procured vegetables here, which had been planted near the basin, by a Frenchman, who, with his four slaves, cure fish for a vessel which transports them annually to the Island of Mauritius. To the southward of the entrance of the basin $1\frac{1}{2}$ miles, in 23 fathoms water, two boats caught above five tons of fish, a species of excellent cod, in a few hours, which were served to the crew and troops on board the Clyde.

Vlaming says, "Near the right road is a salt-water pond, whereto the seals go over the rock that separates it from the sea, about 20 paces. This pond is shaped like a half-moon, and about a pistol shot long." But this pond is now a large basin, at least $2\frac{1}{2}$ miles in circuit, forming almost a complete circle; it is therefore probable, that since his time the sea has formed the present channel into it, and enlarged it to its present size. Vlaming's description of the basin.

The Hindostan anchored here in 1793, about $1\frac{1}{4}$ miles East from the entrance of the basin, when bound out with the embassy to China. On examination, the basin was found to be the crater of a volcano, its circumference at the water's edge being 2,980 yards, or nearly $1\frac{3}{4}$ miles. By taking the perpendicular height of the surrounding sides at 700 feet, and the angle of their inclination at 65°, the circumference of the crater will be 2 miles and 160 yards. The depth of water 29 fathoms, or 174 feet, added to the average height of 700 feet, will make the whole depth of the crater 874 feet, and it is a pretty regular ellipsis. Hindostan's description.

The entrance into the basin is about 25 yards wide, formed by two narrow causeways, or ridges of rocks that run out from two peaks, which terminate the sides of the crater, one on each side; that on the right is 743 feet high, and at its foot, on the causeway, there is a hot spring, where the thermometer stood at 212°, at which were boiled some fish; and this is the general standard of heat at all the springs round the water's edge. From the ship at anchor, fire was seen to issue from various crevices on the island during the night, it being fraught with subterraneous fire.

From the North and West points of the island breakers project about $\frac{1}{4}$ mile into the sea. The tide rises about 3 feet, high water at full and change of the moon about 11 o'clock. Tides, &c.

Sealers who have resided on this island, state the weather to be fine in summer, but stormy in winter, whirlwinds sometimes tearing the water from the surface of the crater. Torrents of rain, which burst over the hills, pour down and form ravines in them. The variation in 1747, was 17° 35′ W.; in 1764, it was 18° 45′ W.; in 1789, it was 19° 45′ W.; and it was 19° 50′ W. in the crater in 1793. By good observations, the anchorage off the basin is in lat. 38° 42′ S., and the South end of the island in 38° 47′ S. The mean of ten ships' observations by moon and chronometers, made it in lon. 77° 51′ E.; the fleet bound to China in 1804, under convoy of H.M. Ship Athenienne hove to under lee of it, 11th of October, and the mean of nine ships' observations by moon and chronometers, made it in lon. 77° 53′ E. Several navigators, however, have Variation.

by their observations, made it farther to the westward; amongst whom Captain T. Lavender, of the ship Roman, of New York, during three different voyages, has made it between lon. 77° 22½′ and 77° 27′ E. It is therefore prudent to keep a good look out, particularly in thick weather, as the longitude of this island is not yet correctly ascertained.

Amsterdam Island.

AMSTERDAM ISLAND, situated on the same meridian as St. Paul, distant about 17 leagues from it, lies in about lat. 37° 52′ S., lon. 77° 52′ E.; being about 12 miles in circuit and high land, it may be discerned 18 or 20 leagues in clear weather.

In 1697, Vlaming, the Dutch navigator, anchored in 16 fathoms black sand, on a spot about a cannon-shot from the shore, at the South part of the island; they landed, but found no water, and the bushes and rushes on this side made it difficult to penetrate into the interior. In 1770, the Morse sent her boat on shore, part of the crew landed with difficulty, and found the island covered with high grass and shrubs, but very little water could be discovered.

Admiral D'Entrecasteux, in passing this island 29th March, 1792, observed it to be all in a blaze, the smoke indicating vegetables on fire, which were probably set on fire by sealers, or by lightning, consequently the vegetation on it may be now diminished. Some little rivulets were perceived on the S.E. side, and it was thought that the sloping of the mountains here would afford an easy landing in favourable weather. He places the West Point in lat. 37° 47¾′ S., lon. 77° 55¼′ E. Captain Wickham visited this island in 1837, and places the highest part in lat. 37° 52′ S., and lon. 77° 34′ 30″ E.; giving 2,750 feet as its height above the level of the sea.

Strong westerly gales prevail near these islands in the winter months, with thick hazy weather, rendering caution necessary when they are approached. Although patches of sea-weed extend to a considerable distance from them, yet these are not always observed in coming from the westward, particularly when the winds blow from this direction.

Passage from St. Paul through Bass Strait or round Van Diemen Land.

THE PASSAGE from ST. PAUL, through BASS STRAIT, or round VAN DIEMEN LAND, has sometimes been followed by ships which departed too late from England to pursue the common route for China; and instead of passing through any of the straits East of Java, as usual, when late in the season, they proceeded round New Holland by the route of the Pacific Ocean; which, although circuitous, and ought not to be adopted under usual circumstances, yet some ships have made tolerable passages to China by this route.

The Walpole left the Cape of Good Hope 21st September, 1794, with a fleet, parted company 7th October in lat. 39° 5′ S., lon. 61° 42′ E., rounded the South Cape of Van Diemen Land 31st, passed to the East of New Caledonia, and reached Canton River 5th January, 1795.

H. M. Ship Athenienne, with a fleet for China, passed St. Paul 11th October, 1804, entered Bass Strait 28th, passed to the eastward of New Caledonia, and reached Pedro Branco on the coast of China 28th December. Since the discovery of Bass Strait, the passage through it is generally preferred to that round Van Diemen Land, as it is equally safe, and greatly shortens the distance.

A ship having passed the Island St. Paul, and intending to pass through Bass Strait, may get into lat. 39° or 39¼° S., then steer East on this parallel; as she advances, the Variation will rapidly decrease; in about lon. 132° E. there will be none; and having advanced 1° or 2° more to the eastward, she will begin to have easterly Variation; at King Island, in the West entrance of Bass Strait, it was 7° 38′ East in 1807.

## SOUTH COAST OF AUSTRALIA.

CAPE LEEUWIN (Lioness), the S.W. extremity of Australia, is in lat. 34° 22′ S., lon. 115° 6′ E. by Captain Flinders, who says, it appeared to be formed by an island lying close to the main land. The Cape is rather high, being visible 10 leagues in fine weather, and has rocky islets and breakers off it to the distance of 5 or 6 miles between S.E. and S.W. The coast to the N.W. also has several islets off it, and the Geographe and Rambler Rocks bear respectively W. by N. 10 miles, and W.N.W. 16 miles from the Cape. An inlet or river on the N.W. side of the Cape is fronted by an island, which obscures it from the view of a ship passing outside, but there is thought to be a navigable passage on each side of the island leading into the river. Cape Leeuwin.

There is a bay on the East side of the Cape, called in some charts Flinders Bay, destitute of shelter, and thought to be dangerous. Soundings of 80 or 85 fathoms are found about 9 or 10 leagues to the S. by W. of this promontory.

The chief places of shelter known on the South coast of Australia between Cape Leeuwin and Bass Strait, where a ship might procure fresh water in case of necessity, are the following:— Places of shelter.

KING GEORGE SOUND, the entrance of which is formed on the South side by Bald Head, in lat. 35° 6¼′ S., lon. 118° 1′ E., is convenient for refitting, wooding and watering, and is well sheltered from all winds but those from eastward; and from these winds it is partially protected by Michaelmas and Breaksea Islands, which lie mid-way in its entrance. Another island, called Seal Island, lies mid-way between the points which form a large bay inside to the westward of Bald Head. King George Sound.

There are several good anchorages in this bay, and there are two harbours, called Oyster Harbour, and Princess Royal Harbour, at the bottom of the sound, which are perfectly secure. Captain King observes, that among the many convenient anchorages in this Sound, the best place for a large ship to refit is Princess Royal Harbour, but for a small vessel Oyster Harbour. A ship only wanting wood and water will find good anchorage in a sandy bay in the S.W. corner of the Sound, in which 2 or 3 streams of excellent water run into the sea over the sand. This bay may be known by its being the first to the westward of a rocky point that projects from some remarkable bare sand hillocks; as also being the second sandy beach to the westward of the low flat rocky islet near the shore inside Seal Island. The anchorage between Seal Island and the first sandy beach to the westward of Bald Head with the low flat islet bearing West, in 6 or 7 fathoms, is preferable during the summer months.

The approach to Bald Head is pointed out by the Eclipse Isles, which lie between 2 and 3 leagues to the south-westward of it. Although there is no set of tide in the sound, it is said to run with considerable strength in the narrow entrances of these harbours, making high water once in 24 hours, and this always between 6 and 12 at night. A settlement has been fixed at King George Sound, which appears to flourish, the country around being well watered, adapted for agriculture, and the climate temperate and healthy. Tides.

PORT LINCOLN, about 7 leagues North from Cape Catastrophe, the S.W. extremity of Spencer Gulf, is a very secure harbour, discovered by Captain Flinders, in February, 1802, where fresh water is got by digging pits at the head or western extremity of the port. Its entrance is 5 miles wide, between Cape Donington and Point Boston, having Boston Island midway within these points. The channel for Port Lincoln.

ships is between the Island and Cape Donington. Lat. of Point Boston 34° 40′ S., lon. 135° 53′ E.

Nepean Bay.

NEPEAN BAY, at the N.E. part of Kangaroo Island, is sheltered from all winds but those from the North: Captain Flinders seems not to have found any fresh water convenient for ships at this place, but plenty of Kangaroos were shot. The South and West coasts of Kangaroo Island were not explored, but Investigator Strait, formed between the North side of the island and Cape Spencer, is wide and safe; Back Stairs Passage is above 2 leagues wide, formed between the East end of the island and Cape Jervis, having some islets called the Pages at its entrance, but it affords a safe approach, and is the shortest route to Nepean Bay. Point Marsden, which is the North extreme of Kangaroo Island and the N.W. Point of this Bay, is in lat. 35° 33′ S., and lon. 137° 41′ E.

Hammant Island.

HAMMANT ISLAND, discovered by Capt. Hammant in the brig Endeavour, 6th July 1817, at 7 A.M., he made in lat. 36° 27′ S., lon. 137° 2′ E., and it appeared to be about 30 feet in height and 40 yards in circuit, with breakers bearing from it S.W. 3 miles, another breaker, N.W. by N. 6 miles, and a third breaker bearing from it N.E. by E. about 1 mile. Afterwards, at 10 A.M., saw Kangaroo Island, distant about 7 leagues.*

Pollock Reef.

POLLOCK REEF, discovered by Capt. J. S. Pollock, of the barque Merope, on his voyage from Western Australia to Van Diemen Land in 1834, is a dangerous narrow shoal, with apparently about 2 feet water on it, extending 8 or 10 miles in an East and West direction, and about 100 yards in breadth. The western extremity, upon which part only the sea broke, is in lat. 34° 35′ S., lon. 123° 26′ E., or 14 miles S. ¼ W. from the S.E. island of the Recherche Archipelago.

Brockman Reefs.

BROCKMAN REEFS, discovered by Capt. J. Brockman, of the schooner Eagle, on his voyage from Hobart Town, Van Diemen Land, to Swan River, are situated nearly 20 leagues to the southward of Kangaroo Island, and seemed to be very dangerous. At noon, December 21st, 1831, being in lat. 36° 17′ S., lon. 137° 21′ E. by chronometer, saw from the mast head heavy breakers, bearing S. by E. ½ E. by compass about 5 or 6 leagues, and another patch of breakers W.S.W. about the same distance. Next day was within 4 or 5 miles of these reefs, and the southernmost appeared to be 3 or 4 miles in length, with several small rocks scattered over it, a few feet above water. The western reef was rather less in extent, with similar dry docks, and high breakers on both of them; and there appeared to be a passage about a mile wide between them. Hove to, in the night, and at day-light next morning were within ½ a mile of another reef of rocks, partly dry and about 100 yards in length, apparently about 10 miles distant from the nearest part of Kangaroo Island, and on the parallel of the western extremity of that island. No soundings were taken when in sight of these reefs, as the sea appeared to be deep all around. At noon, 22d, the southern reefs were not in sight, nor was any part of Kangaroo Island visible when near them, although the weather was clear.

Clint Rock.

CLINT ROCK, discovered in August, 1832, by the cutter Mary Ann, of Sydney, on her passage from King George Sound towards Hobart Town, was approached

* There appears to be considerable doubt respecting the position, and even the existence of this island. It is placed in the Admiralty Chart in lat. 38° 32′ S., lon. 127° E. (doubtful).

very close; being only about ten feet above water, very small, with birds resting on it, and not being marked in the charts, must consequently be dangerous to vessels passing in its vicinity during thick weather, or in the night. By the reckoning from St. George Sound, this danger lies in lat. 37° S., lon. 139° E., which is probably correct within a few miles; for although observations were not obtained, yet on making the land afterwards, the dead reckoning was found nearly true.

No places of shelter have yet been discovered between Kangaroo Island and Bass Strait, and few parts of the coast afford any fresh water. Soundings extend a considerable way out, along the whole coast from Cape Leeuwin to Bass Strait.

Cape Otway and King Island.

CAPE OTWAY, in lat. 38° 50′ S., lon. 143° 32′ E., is a high promontory, bounding the West entrance of Bass Strait on the North side. The entrance between the Cape and the North end of KING ISLAND is about 14 leagues wide, the latter being in lat. 39° 34′ S., lon. 143° 55′ E. A Reef projects from Cape Otway about a mile; but the coast from the Cape to Port Philip is free from danger and has regular soundings off it.

Harbinger Reefs.

About 3 or 4 miles W. N. W. of the North point of King Island lie the Harbinger Reefs, consisting of high breakers in patches, with a passage through them, and another between them and the island, and there is a rock, called Navarin rock, between 4 and 5 miles farther to the eastward, bearing from the North end of King Island N. E. 1½ miles. Captain Wickham, who, in 1838, examined this part of Bass Strait in H.M.S. Beagle, says that the North end of King Island should not be approached nearer than 5 miles, as within that distance the tides are strong (between 2 and 3 knots), and there is generally a heavy swell. New Year Isles are a little farther to the southward, fronting a bay on the N.W. side of King Island, where vessels can anchor well sheltered from easterly winds. There is anchorage inside them in from 6 to 9 fathoms ¾ of a mile off shore. The brig Harington rode close under New Year Isles, during a gale at S.W.; but the best anchorage in westerly winds is on the N. E. side of King Island, in 10 or 12 fathoms sand, where there is a fresh water lake inland.

New Year Isles, &c.

The South Point of King Island is in about lat. 40° 9′ S., and the extent of the Island from North to South being about 11 leagues, and 6 leagues from East to West: it may be seen at the distance of 10 or 12 leagues. Sea-Elephant Bay, on the middle of the East side, and the Bay of Seals at the S. E. side of the island, also afford shelter from West and N.W. winds. The tide rises 12 feet; high water about 3½ hours on full and change of the moon.

Tides.

The channel between the South end of King Island and Hunter Isles, fronting the N. W. end of Van Diemen Land, may be used if necessary; but as Reid rocks, and other dangers nearly in mid-channel, are not sufficiently explored,* the North channel is preferable.

Wilson Promontory.

WILSON PROMONTORY, in lat. 39° 11′ S., lon. 146° 24′ East, projects nearly South about 8 leagues from the low land of the main, forming the northern boundary of the East part of Bass Strait, and may be seen 15 leagues. This, the southernmost land of Australia, is easily known by its height, and several groups of islets around. REDONDO, a white pyramidal rock, distant about 3 leagues, nearly South from the

* Bell Rock, with the sea breaking over it, was discovered 13th November, 1824, by Capt. Bell, in the Minerva, who passed between it and Reid Rocks, within ½ a mile of the Breakers. When on the Black Pyramid, the Breakers bore E.S.E., nearly ½ a mile distant; Reid Rocks then bearing North about 5 or 6 miles; cloudy weather obscured King Island at the time.—The following positions of these dangers are given by Captain Wickham, R.N. Bell Rock, lat. 40° 23′ S., lon. 144° 7′ E.; Reid Rocks (centre), lat. 40° 15′ S., lon. 144° 9′ E.; Black Pyramid, lat. 40° 28′ S., lon. 144° 19′ E. Captain R. Drinkwater Bethune, of H.M.S. Conway, places a rock in lat. 40° 24′ S., lon. 144° 0′ E.

promontory, and bearing E. ¾ N. *true* from the North part of King Island, distant 37 leagues, may be discerned 10 or 11 leagues. MONCUR ISLES, a small group, lie 2 leagues East of Redondo; and HOGAN GROUP lies East of Redondo about 8 leagues, being in lon. 147° 2′ E., and are high islands.

Sir Roger Curtis Isles.

SIR ROGER CURTIS ISLES, distant 39 or 40 leagues *true* East from the North end of King Island, may be seen about 11 leagues, the southernmost of them being two small and high peaked rocks, situated on the parallel of the North end of King Island, but the northern island is much larger.

Devils Tower.

DEVILS TOWER lies about 2 or 3 leagues to the N. E. of the North, or largest isle of Sir Roger Curtis Group; it is called also Fortification Isle.

Crocodile Rock.

CROCODILE ROCK lies nearly in mid-channel, between Redondo and Sir Roger Curtis Isles, and is very dangerous. The Castle of Good Hope, Capt. M'Askill, 7th February, 1803, running at the rate of 9 miles per hour, in order to get through Bass Strait before night, saw when entering the channel between Sir Roger Curtis Isles and Redondo, breakers a-head very close; the helm was put down, sail instantly reduced, and the ship cleared the rock about ½ a cable's length, upon which the sea foamed with breakers. It appeared about 12 or 14 yards in extent where the sea broke, but has probably a greater base, and although a part of this rock is only 2 feet under water, the sea perhaps does not break on it at high tides when the weather is fine. From Redondo it bears about S. E. ½ E. 7 miles, and from Sir Roger Curtis Isles N. W. ¼ W., distant about 11 miles, and is steep to. Captain Park, of the Cato, 3d April, 1803, also saw the Crocodile Rock, and passed within a mile of it, in 45 fathoms water, the sea then breaking high upon it: he states, that it bears S. E. by E. 2½ leagues from Redondo, and 5 leagues S. E. by S. from Wilson Promontory.*

Kent Groups.

KENT GROUPS, bearing *true* east from Sir Roger Curtis Isles, distant about 9 leagues, consist of two detached groups, the smaller about 2½ or 3 leagues W.S.W. of the larger, one of them being of a remarkable form, and called Judgment Rock. All these isles are steep, rocky and barren; and the two largest may be seen at 10 or 12 leagues distance; between these there is a safe channel, where small vessels might be sheltered from easterly or westerly winds, in two small coves, with sandy beaches at their head. There is also a safe channel between the two groups.

Pyramid. Wright Rock. Craggy Island.

THE PYRAMID, in lat. 39° 52′ S., is a high rock, bearing S. S. W. from the body of Kent Group, distant about 6 or 7 leagues; another rocky islet, sometimes called Wright Rock, lies about 4 leagues to the S. E. of Kent Group; and about 2 leagues farther in the same direction Craggy Island is situated, nearly midway between Wright Rock and the N.W. end of Great Furneaux Island.

Endeavour Rock.

ENDEAVOUR ROCK, discovered in 1817, by Capt. Hammant, in the brig of this name, and placed in lat. 39° 38′ S., lon. 147° 35′ E., is thus described by him. When the South end of Kent Group bore W. by N., Craggy Island, S. S. E., the islet called

* The position of Crocodile Rock was satisfactorily determined by Capt. Hobson, R.N., in 1837, and reported to Capt. Beaufort as follows. The Rock bears from Redondo S. 42° E. 6 miles; from Sir Roger Curtis I. (summit), N. 47° W. 11⅓ miles, and from Devils Tower, West, 13⅓ miles. He describes its S.E. end, for a space of probably 50 yards, as elevated 3 or 4 feet above high water, with a reef extending ¾ of a mile to the N.W. He recommends ships coming from the westward to keep Devils Tower to the northward of E. by N., or to the southward of E. by S., as a means of avoiding it.—*Naut. Mag. for* 1837, p. 606.

Wright Rock S.W. by S., saw a reef with two small rocks on it, visible at the rebound of the sea, bearing S. $\frac{3}{4}$ W., being then low water; this danger lies in a line between Craggy Island and Wright Rock, about a third of the distance from the latter, and directly in the track recommended by some navigators for passing through the strait.*

THE CHANNELS between all these groups of islands from Wilson Promontory to Furneaux Islands are safe in the day time with moderate weather, taking care to avoid the Crocodile Rock, if the channel between Redondo and Sir Roger Curtis Isles be adopted; and the Endeavour Rock, if the channel to the South of Kent Group is followed; but great caution is necessary, if a stranger attempt to pass through any of them in the night. Channels.

BANKS STRAIT, formed between Furneaux Island and the N.E. end of Van Diemen Land, is also safe, but not so much frequented, nor so wide as the channels to the northward; it lies out of the direct route of ships coming from the westward through Bass Strait bound to Port Jackson, or other parts to the northward. Banks Strait.

BASS STRAIT should be approached with caution, by ships coming from the westward, if not certain of their latitude, which ought to be correctly ascertained, before they reach lon. 143$\frac{1}{2}$° E.: and the strait ought not to be entered in the night, unless the land has been previously seen, or both the latitude and longitude be known, by observation. The parallel of 39° or 39° 20′ S., according as the wind may incline, is the best track for passing between King Island and Cape Otway; and a sight of either, or preferably of both, will point out the true situation. Directions for sailing through Bass Strait.

Westward of the North end of King Island, at 10 leagues distance, there are soundings from 65 to 70 fathoms sand, which will indicate the proximity of the Strait in thick weather. The only danger to be apprehended here is the Harbinger Reefs, two patches situated nearly two leagues to the N.W. of the north end of King Island; but are so far separated from it, and from each other, as to leave passages between them, in case of necessity, where the shoalest water found by the Cumberland schooner was 9 fathoms.

Having passed the North end of King Island, a course should be made good from it E. by S. for Sir Roger Curtis Island, and part of this distance may be run in the night with a good look out: the soundings in this track to the eastern part of the strait are regular, from 35 to 48 fathoms, fine sand and shells. The best track is on the South side of Sir Roger Curtis Isles, and on either side of Kent Groups, keeping near the southernmost island of the group, if the South channel is chosen, to avoid the Endeavour Rock; then steer E.N.E. if nearly before the wind, or on either side of this course, as the wind may incline, taking care not to approach the northern Long Beach formed between Wilson Promontory and Cape Howe, which becomes a concave lee shore with a S.E. gale. This makes the channel South of Kent Groups preferable at times, to those North of them; but with a steady N.W. wind and settled weather, either of the channels South of Redondo might be pursued occasionally; then a course steered well to the eastward to give a berth to the Long Beach, and Cape Howe may be rounded at any reasonable distance.

The most convenient places for anchoring in the Strait with easterly winds are (according to Capt. Flinders, from whose survey the preceding directions for Bass Strait are chiefly taken) under the N.W. end of King Island, near the New Year Isles; in Anchoring places with easterly winds.

* The bearings here given will not place the danger in the position here described.

Port Philip, just within the entrance, on the South side, so that when a fair wind comes, a ship can get out of the port by help of strong tides; Hunter Isles, between Three-Hummock and Barren Islands, taking care not to anchor too close to the weather shore, lest the wind change suddenly; on the West side of Wilson Promontory, *in a case of necessity only*, for this place is dangerous, if the wind change suddenly to S.W., as a deep bay is formed between the Promontory and Cape Liptrap; Kent's Large Group, for brigs and small vessels, in one of the small sandy coves under the eastern island; Furneaux Islands, between Clarke and Preservation Islands; and if a ship be not able to weather Clarke Island, and pass out to the S.E. ward through Bank Strait when the wind becomes fair, she may run through Armstrong Channel, with a boat a-head and a good look out.

Port Philip. PORT PHILIP is an extensive lagoon or basin, 60 or 70 miles in circumference, with an entrance less than 2 miles wide. It is the westernmost harbour on the North side of Bass Strait, distant 17 or 18 leagues to the north-eastward of Cape Otway, and the entrance is in lat. 38° 18′ S., about 4 leagues to the eastward of a bluff headland without trees, rising from low land thickly wooded. The soundings about 3 miles from the entrance are 20, 12 and 13 fathoms, decreasing to 7 or 8 fathoms near it, and until 3 or 4 miles within the entrance, irregular from 6 to 12 fathoms. A reef projects from each side of the entrance, and the ebb tide runs out of it at the rate of 5 or 6 miles an hour at springs, resembling breakers. The entrance is formed by Point Lonsdale on the West and Point Nepean on the East. About $2\frac{1}{2}$ miles inside Point Lonsdale is Shortland Bluff, and about the same distance beyond the Bluff is Point Swan. The shore inside Point Nepean returns in a direction nearly parallel with the coast outside, having Observatory Point and Point King at the distance of $1\frac{1}{2}$ and 4 miles respectively from the entrance. On this shore also, about 15 miles E. by S. from Point Nepean is the hill called Arthur's Seat, which is the highest land on the coast. There are three principal channels for proceeding to Hobson Bay at the head of the Port; the western one is the most direct, and for which the following directions are given by Capt. Hobson, under whose orders the Port was surveyed in 1836.—A fair wind or a flood tide is indispensable to enter Port Philip, in which case keep in mid-channel between Point Nepean and Point Lonsdale, and steer for Shortland Bluff until Point Nepean bears S.E. by S., then pass to the westward of Pope's Eye, (a small shoal 2 miles N.E. of Point Nepean) by keeping Swan Point to the northward of N. $\frac{3}{4}$ E. until Shortland Bluff bears W. $\frac{1}{2}$ S. and steer for the entrance of the channel which lies between the West Bank (which joins the shore) and William Sand.

To clear the bank off Swan Point, keep Point Lonsdale just open of Shortland Bluff, until Swan Point bears N. $\frac{1}{2}$ W. The course is then N.N.E. and the mid-channel will be preserved by keeping Point Nepean a little open of Swan Point. The soundings are from 4 fathoms in the centre to $2\frac{3}{4}$ at the sides, from which the banks shoal suddenly to 5 or 6 feet, and in some places dry at low water. When Station Peak (a high mountain to the N.W.) is seen over the North red cliff bearing N. 72° W., you are clear to the northward of the banks and will be in 7 fathoms water. The course will then be N. by E. $\frac{1}{2}$ E. to the anchorage in Hobson Bay off William Town. It is always advisable to keep a look-out from the mast-head whence the shoals may generally be distinguished. The tide runs from 2 to 3 knots per hour following the direction of the channel. Although this is an excellent harbour, or rather a very extensive lagoon, having a rivulet falling into the upper part of it, there is no fresh water in the vicinity of the entrance, the nearest being found at the south-eastern angle of the harbour to the westward of the hill called Arthur's Seat. Capt.

Wickham places the jetty of Hobson Bay in lat. 37° 51′ S., lon. 6° 19′ W. of Sydney. Var. 8° 45′ E. (1838).

WESTERN PORT, entrance, in lat. 38° 31′ S., distant about 8 or 9 leagues E.S.E. from Port Philip entrance, is formed by Cape Schanck on the West side, and the West point of Philip Island, called Point Grant, bounds its eastern side. The North side is lined by shoals, making it necessary to keep near to Point Grant and the North side of Philip Island, in steering E.N.E. into the port. This harbour may be chosen as a place of shelter, if a ship is driven near its entrance by a southerly gale, being much wider than the entrance of the former port; and there is fresh water up a rivulet at its south-eastern angle. Western Port.

The coast between Port Philip and Western Port presents a continued barrier of rock, with a heavy swell generally tumbling in upon it from south-westward.

SEALERS COVE, at the eastern angle of Wilson Promontory, has depth of water for a ship, and room for a small vessel to swing: it is only open from E.N.E. to E.S.E., but these winds throw in very little sea; the tide rises 10 or 11 feet; high water 2 hours before the moon passes the meridian. Wood and fresh water may be procured in abundance. Seal Islands lie N.E. from the Cove. Sealers Cove. Tides.

## WINDS AND CURRENTS.

THE WINDS near Cape Leeuwin blow generally from westward; in summer, varying from N.W. in the night, to S.W. in the latter part of the day, though not regular; and in winter this variation is not experienced. A long swell appears to come at all times from S.W., indicating that the strongest and most durable winds blow from that quarter, which is confirmed by experience. Winds near Cape Leeuwin.

From the Archipelago of Recherche, along the South coast to Bass Strait, from the middle of January to the middle of April, the prevailing winds are between S.E. and E.N.E.; coming more from the land at night, and from the sea in the day, but seldom strong; whereas the winds which occasionally blow from westward are always fresh, and sometimes become gales, veering in this case invariably to the S.W.

In Bass Strait the gales and strongest winds come from S.W., and during nine months of the year they generally blow from the western quarter. In January, February, and March, easterly winds with fine weather are not uncommon; but these are not to be depended on at any other season. The gales usually come between S.W. and S.E., most frequently from the latter direction, rendering it hazardous to approach the coast between Cape Howe and Wilson Promontory. On the eastern side of the Strait, and of Van Diemen Land, North or N.E. winds not unfrequently happen, but seldom blow strong. Gales in Bass Strait.

Off the South coast of Australia, speaking generally, it may be considered that during the six or eight winter months the winds blow almost constantly from some western point, and that gales of winds at S.W. are frequent. The progress of the gales is usually this: the barometer falls to $29\frac{1}{2}$ inches, or lower, and the wind rises from the N.W. with thick weather, commonly with rain; it veers gradually to the West, increasing in strength, and when it veers to the southward of that point, the weather begins to clear up; at S.W. the gale blows hardest, and the barometer rises, and by the time the wind gets to South or S.S.E., it becomes moderate, with fine weather, and the barometer above 30 inches. Sometimes, the wind may return back to West, or more northerly, with a fall in the mercury, the wind diminishing in Winds on the South Coast.

strength, or dying away; but the gale is not over, although a cessation of a day or two may take place. In some cases, the wind flies round suddenly from N.W. to S.W., and the rainy, thick weather, then continues a longer time.

Winds on the East Coast.

Such is the usual course of the gales along the South Coast, and in Bass Strait; but on the East side of the Strait the winds partake of the nature of those on the East Coast, where the gales often blow hardest between South and S.E., with thick weather, and frequently with heavy rain.

Barometer.

The barometer rises generally with southerly winds on the South Coast, and falls with northerly winds. On the South, East, and West coasts of Australia, sea winds, when the weather is moderate, almost always raise the barometer which falls with land winds.

Northerly winds.

Northerly winds do not prevail near the land, but in lat. 40° and 44° S., to the westward of Van Diemen Land, strong N.N.E.* winds often happen, shifting sometimes suddenly to N.W. and westward.

Several ships have experienced these northerly winds when steering for Bass Strait, which have driven them to the southward of that route, and obliged them to proceed round Van Diemen Land. In July 1802, the Perseus running in lat. 40° S., for Bass Strait, had strong North, and N.N.E. winds, with a southerly current, several degrees to the westward of the Strait, which forced her to go round Van Diemen Land; here, the winds were very changeable, much from south-eastward, with northerly currents, till her arrival at Port Jackson late in July.

In November, 1800, the Royal Admiral, in lat. 43° to 44° S., running East for Van Diemen Land, had the winds mostly at N.N.E. and N.W.; sometimes at West and W.S.W. When round Cape Van Diemen, she had North and N.E. winds three days, then variable between East and S.S.W. till her arrival at Port Jackson on the 20th of November.

Currents.

THE CURRENT, near Cape Leeuwin, is separated into two branches, one running northward along the West Coast of Australia, and the other running to the eastward along the South Coast; which Captain Flinders attributes to the strength of the prevailing S.W. winds, impelling the water of the ocean towards the land, and this meeting with the Cape is deflected in different directions as mentioned above. From Cape Leeuwin to King George Sound, the current was found to set eastward in May and December, about 27 miles daily. From thence to a little beyond the Archipelago of Recherche, in with the shore it set N.E. 13 miles; and at a considerable distance from the coast it ran N.E. by E. 16 miles per day, the wind being more from the southward than from the northward in both cases.

In coasting all round the Great Australian Bight, from the Archipelago to Cape Northumberland, very little current was perceived, and it generally followed the impulse given to it by the winds; but in May, crossing the Great Bight, it ran about 14 miles per day to north-eastward, the winds prevailing strong from the southward.

In Bass Strait, the current does not set to the eastward in common cases, as the flood comes from that direction, and flows westward to Hunter Islands, and King Island, where it meets another flood from the southward: but the Bight on the North side, between Cape Otway and Wilson Promontory, lies out of the direct set of the tides. Nevertheless, if the wind blow strong from westward, it will be prudent to allow for an easterly current, which, during a West and S.W. gale, has been found to set S. 73° E., about 35 miles in one day.

* These winds also happen in the same latitudes, from the meridian of Cape Agulhas to Van Diemen Land, and sometimes shift in a similar manner.

# WEST AND N. W. COASTS OF AUSTRALIA.

## COAST, BAYS, AND DANGERS.

GEOGRAPHE BAY lies on the East side of Cape Naturaliste, this cape being in lat. 33° 28′ S., lon. 114° 55′ E.; the bay is 4 or 4½ leagues wide, and 3 leagues in depth, open to northerly winds, but sheltered from W.S.W. and southerly winds, having moderate soundings of 18, 12, and 10 fathoms, to 5 and 4½ fathoms near the shore at the bottom of the bay. About 4½ or 5 leagues N. ¾ E. from Cape Naturaliste, there lies a shoal called Naturaliste Shoal. In the S.W. angle of Geographe Bay, small vessels may anchor with the N.W. extreme point bearing N.N.W., or N. by W., and be sheltered from the W.N.W., or even N.W. winds. Geographe Bay.

The coast from the eastern side of Geographe Bay, extends nearly N. by W. to Garden Island near Swan River, excepting Cape Bouvard in lat. 32° 34′ S., lon. 115° 23′ E., which projects a little from the coast line to seaward; and from hence to Rottenest Island, there are various banks and islets near the coast. Cape Bouvard.

Between Cape Bouvard and Cape Peron is the anchorage of WARNBRO SOUND, surveyed by Lieut. Roe, R.N., in 1839. It has from 5 to 11 fathoms water, and on the North side is a small harbour, called Peel Harbour, with from 4 to 6 fathoms water. The sound is protected to seaward by reefs and banks, through which is the entrance channel to the southward of a rock above water, called Passage Rock, which is in lat. 32° 18′ S. Warnbro Sound and Peel Harbour.

ROTTENEST ISLAND, in lat. 32° 2′ S., lon. 115° 25′ E. (the centre), is moderately elevated, nearly 3 leagues in length East and West, and 4 miles in breadth from North to South, being about 4 leagues distant from the entrance of Swan River, and bearing from it about W.N.W. A reef nearly surrounds the island, and from its south-eastern side extends about 2½ leagues to the S.E., nearly joining Carnac Island, at the entrance of Cockburn Sound; there is, however, good temporary anchorage in the usual westerly winds on its N.E. side in 10 fathoms. Rotten Island.

COCKBURN SOUND, between Garden Island and the main land, may be considered as the outer harbour of Swan River, from the entrance of which it is distant about 6 miles farther South. Garden island is a long narrow island, having its length parallel with the coast, and forming with Cape Peron the deep bight of the sound. Off its North end are numerous islets, rocks, and banks, affording a further protection to the anchorage. The principal islet is called Carnac, between which and the North point (Beacon Head) of Garden Island is the main entrance to the sound. Cockburn Sound is the best anchorage on this coast; the depth in it varies from 12 to 6 or 7 fathoms, clear ground, except on the banks, which are easily perceived; near the island side of the sound, the only points open to the sea, or on which the land is not seen, are from North to N.E., but the main land fronts that direction, and a treble barrier of shoal water banks, on the nearest of which there are only 2 and 1½ fathoms water, breaks off any sea that might arise in that extent. This sound is considered to be perfectly secure, capable of sheltering any number of vessels of the largest size. Sulphur Cockburn Sound.

Bay, close under the East side of Garden Island, has 7 fathoms water close to its beach, and the shore of the mainland has smooth and deep water fronting it, except on the shoal banks; this is considered the best anchorage in winter. Although this place affords safe anchorage, it may nevertheless be thought inconvenient for trading ships having cargoes to deliver in Swan River, the distance to which being 6 or 7 miles; but they need not anchor in Cockburn Sound, except in the season when N.W. gales may be expected; at other times Gage Road will be both safe and convenient.

Directions for Cockburn Sound.

The following directions have been given by the master of H.M.S. Success, for sailing into Cockburn Sound. Coming from seaward, bring the North point of Garden, or Buache Island, to bear E. by N. and keep it so, until about 2 miles from it, then steer North, until the S.E. point of Carnac Island bears E.N.E. Steering then E.N.E. for the latter, be careful, on bringing the North white sandy point of Garden Island, to bear S. by E. ½ E., to steer S.E. till a round rock opens to the eastward of Carnac, (as this will take you clear of a detached rock off Garden Island;) steer then S.S.E. which will carry you up to Success Bay in Cockburn Sound, clear of Carnac Ledge, and over the tail of the Spit at the first bay of Garden Island, having 7, 6, 5, and 4 fathoms.

In sounding between Rottenest Island and the rocks and reefs to the eastward of it, a good channel was found, with from 9 to 5 fathoms water, with the north western-most rock bearing S.E. by E. Variation of the compass 5° 20′ W. High water at 9 hours on full and change of moon. Rise of tide 2½ feet.

The entrance of Swan River is easily distinguished by its low black rocky heads, or cliffs on the white sandy beach, and in steering from Rottenest Island or its adjoining Reefs towards the entrance of the river, do not go farther to the southward than to bring these cliffs to bear E.N.E., without having a boat a-head to sound; as the water shoals to 3 fathoms, and then to 2 fathoms farther to the southward.

To sail from Gage Road off Swan River, to Success Bay or Harbour, steer over to the S.W. towards a large round rock, and do not bring this rock to the westward of S.W. until the North point of Garden Island (which is a white sandy point) comes just on, or open with the rock on the S.E. point of Carnac: this mark will lead you close to a cluster of small rocks (just above water, about a ¼ mile to the eastward of the large round rock), in 17 or 18 feet water at high tide. Abreast of these rocks the channel is very narrow, the shoalest and most contracted parts being about ¼ mile, when the round rocks and the small rocks are in one bearing West. After passing to the southward of the small rocks, the channel quickly widens, and the water deepens to 4 fathoms. Do not come nearer to Carnac than ¾ of a mile, as the water is shoal around. The spit which partly surrounds this anchorage, commences about 2 miles to the southward of Swan River, and extends from the main towards the small rocks, off the round rock mentioned above, where it terminates in a point, with the small rocks and round rock in one, bearing West by compass; it then trends to the S.E. about a mile, then to southward, S.W. and westward, finally uniting to the rocks off the S.E. end of Carnac. Upon this spit the usual depth of water is 2½ fathoms, and in some places 3 fathoms. Cockburn Sound and the entrance of Swan River have been surveyed by Lieut. Roe, R.N., the surveyor-general, and the several channels are now indicated by buoys and beacons. Lieut. Roe's directions are as follows:

On approaching the land keep the Haycock on Garden Island about N.E. ½ N. till within 1½ miles of it, when you will have passed over the outer 5 fathoms bank and will be in 9 to 11 fathoms water. Then steer to the northward till the Challenger Buoy comes in one with the Stags and Spit beacons. A Pilot will then come on board, but you may safely run into Cockburn Sound by the Chart, keeping the Challenger and Stags on one hand, and the Mid-Beacon and Flat Ledge on the other. The

Snapper Buoy and Pointer Beacon shew the southern passage into Owen anchorage or into Gage Road by passing the Mewstone, which may be done on either side.*

SWAN RIVER, (Arthur Head), is in lat. 32° 5′ S., lon. 115° 34′ E. Gage Road, fronting the mouth of Swan River, affords anchorage for ships of any size, in depth from 12 to 4 fathoms, the bottom being good, and it is sheltered by the main-land, islands or banks, all round, except from N.N.W. to W.N.W.; the N.W. gales in winter render it unsafe at that season, several ships having been driven from their anchors and wrecked. A vessel may anchor in 4 or 5 fathoms, within a cable's length of the river's mouth, or from the beach of Gage Bay, and have an easy communication with the shore. To the southward of Arthur Head, there is a bay well sheltered, but as the depth of water is not more than 2 fathoms, it is only fit for small vessels. Swan River and Gage Road.

MELVILLE WATER is a capacious basin within the heads which lead to Swan River, the entrance to which, formed between these heads, is over a bar having only 6 feet on it at low water, consequently only navigable by boats. About a mile inside the heads the water deepens, and then commences a succession of natural cliffs or wharfs, with 4, 5, or 6 fathoms close to them; and for several miles upwards, there are from 5 to 8 fathoms over a large expanse of water, which would be one of the best harbours in the world if it had a suitable entrance, and Captain Stirling is of opinion that such might be made without much difficulty at a moderate expense. The water in this magnificent basin is salt, and it continues so for a considerable distance up Swan River, but in ascending farther, the water became quite fresh, with a fine country adjacent, diversified with hills and forest trees; the soil generally fertile, well adapted for cultivation, with plenty of fresh water, and small lakes of fresh water were discovered in several places among the hills. Canning River, extending from Melville Water in an easterly direction, was ascended about 20 miles by Captain Stirling, and appeared similar to Swan River, excepting that it had greater depths of water, there being 4, 5, and 6 fathoms for several miles above its entrance; farther up, both it and Swan River are only navigable by boats. Melville Water.

The bank of soundings opposite to this part of the coast extends nearly 30 leagues from the land, with usually a regular decrease of depth as the coast is approached. Land and sea breezes alternate the shore in summer; and this place being situated close to the southern limit of the southerly trade wind, presents admirable facilities for vessels passing to and from it in every direction. Bank of Soundings.

HOUTMAN'S ABROLHOS, between lat. 28° and 29° S. (from Van Keulen's account) are the same on which the ship Batavia in 1629, and the ship Zeewyk in 1727, were lost. The crew of the last ship, found them to consist of ten or twelve Sandy Islands, united to one another by reefs, supposed to be 32 or 36 miles from the main-land, which was not seen from the shoals: between these shoals and the coast, the sea is clear with deep water. On the easternmost Island, lying 16 miles distant from them to the S.E. they found some pieces of wreck, and a little underwood; but no fresh water was got in the pits which they dug, though Peisart in 1629, found good water on one of the islands, in two small holes: the said crew built out of the wreck a vessel, wherewith they arrived at Batavia. Houtman's Abrolhos.

Captain Daniel, in the London, saw the shoals in June 1681. "With the wind S.W. by W., steering by compass N.E. by E., at 10 A.M. the water was discoloured:

* In the Nautical Magazine, for 1835, page 134, a particular description is given of all the buoys, beacons, and marks, for the channels of Cockburn Sound.

a man at the fore-top, saw a breach rise a-head of us; we put our helm hard a starboard, and stood away N.W. by W. and weathered the N.W. end of it about ½ a mile: at that distance the depth was 35 fathoms white corally ground, with some red mixed; next depth (about two hours after we tacked) was about 40 fathoms, the same ground; and at 9 P.M. having run off by log on a N.W. by W. course, about 24 miles, had no ground at 65 fathoms.

"The breach, which we first saw, happened to be the northernmost of all, there being several; and by our computation are near 20 miles in length. Within the breaches, several small white sandy islands were seen, with some bushes on them; a heavy sea broke against the South part of these shoals. When close to them, the mainland was not seen." The western limit of these dangerous shoals, is lon. 113° 20′ E., and the south-easternmost patch, called Turtle Dove, is in lat. 29° 10′ S., lon. 113° 57′ E.

Shark Bay and circumjacent coast.

SHARK BAY, of Dampier, on the East side of Dirk Hartog Island and Road, is a spacious and safe harbour, its centre in lat. 25° S. There are two channels leading to this bay; one in lat. 25° 25′ S., between Dirk Hartog Islands and Barren Island, called Naturaliste Channel by the French, who surveyed this coast; the other to the northward of Barren Island, called Geographe Channel, extending from lat. 24° 25′ S., to 24° 42′ S., between Cape Cuvier, a high red sloping point on the main, and the North end of Barren Island, which island extends North and South along the N.W. part of the Bay, and secures it to the S. W. and westward. The North point of Barren Island is in lat. 24° 43′ S., lon. 113° 7′ E.; and the North point of Dirk Hartog Island, in lat. 25° 27′ S., lon. 112° 55′ E., by the French survey, and there are soundings 9 or 10 leagues to the westward of them.

The land around Shark Bay, is sandy, barren, destitute of inhabitants, fresh water,* or other necessaries; but the approach to this part of the coast is considered to be safe. To the southward of Dirk Hartog Island, in lat. 27° S., it should not be approached by any ship bound to the northward, as Houtman's Abrolhos must be avoided.

Cloates Island.

CLOATES ISLAND (doubtful) is said to have been seen in 1719, by Capt. Nash, in the Imperial ship, House of Austria, who gave it this name. The day before, and several days after, much sea-weed and some small birds like lapwings, both in size and flight, were observed. He made this island in lat. 22° S., and from it he made 7° 26′ westing to Java Head. This island is said also to have been seen in 1743, by the Haeslingfield; and according to the description of both ships, it is about 8 or 10 leagues in extent, N.E. by N. and S.W. by S., of moderate height, level, with a gradual slope at both ends, and high breakers projecting about 3 miles from them. The Haeslingfield made it in lat. 22° 7′ S.; they steered from it nearly North, for seven days, made the land of Java in lat. 8° 30′ S., and in three days more, made Java Head 7° 12′ W. from Cloates Island.

The longitude made by these two ships from this island to Java Head, agrees within 14 miles of each other; and allowing Java Head in lon. 105° 11′ E., Cloates Island will be in 112° 30′ E., by mean of the longitude made by both ships, or 1° 46′ W. from the coast of New Holland; this coast in lat. 22° S., being in about lon. 114° 16′ E.

Island mistaken for it.

Cloates Island, has also been supposed to lie very near the coast of New Holland. The Belvedere's Journal states, January 12th, 1796, at ½ past 8 A.M., steering E. ½ S., saw Cloates Island on the lee bow, bearing E. by N. 5 or 6 miles, hauled up N.N.W.; at 9 the Island E. ½ S., to S. E., breakers off each end from East to S. E. by E., in 25

* Such parts of the West Coast as the Dutch examined, were found destitute of fresh water.

fathoms. Steered N. ½ W. 3 miles to 10 A.M., a bluff point of land seen from the mast-head S. E. ½ E., distant 8 or 9 leagues in 25 fathoms. Steered N. E. by N. 4 miles, N. E. 6 miles to noon: the observed lat. 21° 10′ S., the body of Cloates Island seen half-way up the mizen shrouds bearing S. by W., distant 4 or 5 leagues, in 38 fathoms. Wind at N. W. and westward. From noon, steered N. E. 9½ miles, saw the coast of New Holland from the deck, hauled on a wind N. N. W., being in 17 fathoms red coarse sand at ½ past 1 P.M., January 13th. At 2 P.M., the southern extreme, a bluff point, with high breakers, extending out to a great distance, S. 78° E., the northern extreme N. 50° E., the nearest land N. 76° E. distant 5 leagues.

This was evidently not Cloates Island seen in the Belvedere, but some of the low islands in the bight to the eastward of the N. W. Cape of New Holland, as the island and land she saw are to the northward of the Cape. Cloates Island has probably no real existence, some of the islands near the coast of New Holland having been mistaken for it, when ships were navigated by dead reckoning.

TRYAL ROCKS, like Cloates Island, are of doubtful existence, and named from the English ship Tryal, said to have been lost upon them in 1622. A Dutch sloop sent from Batavia to explore them, in consequence of one of their ships* having seen them in 1718, marks in a plan, the extent of the whole range East and West about 40 miles, and about 15 miles broad in lat. 19° 30′ S., 80 leagues from the coast of New Holland. They are placed in different latitudes; in some of the old charts, from 19° 45′ S., to 21° S., and the meridian of Java Head; also from 1° to 2°, both to the eastward and westward of that meridian. In July 1777, Captain Matthias Foss, of the Dutch ship Fredensberg Castle, saw the Tryal Rocks, and made them by good observation, when they bore East distant 12 miles at noon, in lat. 20° 40′ S., meridian distance 23° 45′ E. from St. Paul, but by the run afterwards, S. ¼ W., 840 miles from Java Head. The Danish account says, "these rocks lie N. W. and S. E. and extend in length 24 miles; the centre of them appears very broad, and not higher out of the water than a small vessel's hull; the extremes are clusters of small broken rocks, now and then appearing as the sea retires, and are about 4 miles from each extreme of the main rock." Tryal Rocks.

Captain Wilson searched for the Tryal Rocks, as placed from the Danish account, and remarks, that neither these nor the island laid down in Thornton's chart exist near lat. 20° 50′ S., between lon. 104° 41′ and 105° 44′ E. He also observes, that the Lascelles, in 1789, passed lat. 20° 50′ S., in lon. 104° 12′ E. by chronometer; and that he passed the same latitude in the Carnatic in 1786, in lon. 103° 34′ E. by chronometer; then concludes with this useful remark:—

"If rocks of the Dane's description were situated within these limits, *i. e.* betwixt 103° 34′ E. and 105° 44′ E., it is barely possible, that the Lascelles, the Carnatic, and the Vansittart could have passed without seeing them; and I have not a doubt, if the tracts of other direct ships, with chronometers on board, were examined, even these limits would be extended to the westward, in which no such island, or rocks can lie. Whoever, therefore, would look for the Tryal Rocks, as reported by the Dane, will do it with much greater probability of finding them to the eastward of 105° 44′ E., than to the westward of that limit."

* Van Keulen says, they were seen in the ship Vaderland Getrouw, found to lie in 20½° S., and that she had 57 to 65 fathoms fine soft sand, when they bore E.N.E. 8 miles. The Jane frigate's journal, has the following remark:—June 27th, 1705, according to custom, hove to, on account of the Tryal Rocks (if such rocks exist), for although they are reported to extend 20 leagues in length, I was informed by the Commodore of the Dutch ships, with whom I went home last voyage, that he never heard of these rocks having been seen. If they exist, they must lie much farther East than in the route towards Java Head, or they must have become more familiar to us.

As the Danish account places the Tryal Rocks about 44 miles to the westward of Java Head, or in about lon. 104½° E., and the Dutch account within 80 leagues of the coast of New Holland, upward of 10° more easterly, it may be inferred, that it cannot be one and the same, but two different shoals seen by them; the latitude differing also more than one degree, strengthens this opinion; there is reason to think that neither the Tryal Rocks, nor Cloates Island, have any real existence, notwithstanding the foregoing remarks.

In 1770, the Harcourt, Captain Nathaniel Paul, is said to have sounded in 40 fathoms stiff clay, on a bank which they reckon in lat. 21° 0′ S., and 28° 30′ E., from St. Paul, or about lon. 106° 23′ E.

Captain L. Wilson, in the Vansittart, July 5th, 1789, thought soundings of 75 fathoms stiff mud were got, and broke the deep sea line, in lat. 20° 54′ S., lon. 105° 25½′ E., which Captain Wilson called Harcourt Bank; but as no soil came up on the arming of the lead, the quarter-master was probably deceived.

Moffat Shoal (doubtful).

MOFFAT SHOAL (doubtful), seen at 1 P. M., November 26th, 1818, by the ship of this name, at which time she passed over the tail of an apparent shoal, the water being very white, but no breakers, and there may be 8 or 10 fathoms over the white coral, or, perhaps, sandy bottom. After taking in sail and heaving to, got no ground at 100 fathoms, the shoal then seen from the mizen-top, bearing from S. W. ½ W. to N. by W. ½ W.; made it in lat. 21° 37′ S., lon. 112° 25½′ E. by mean of chronometers and lunar observations, differing only 9 miles.

Clark Reef.

CLARK REEF is in lat. 20° 18′ S., and bears N. W. by compass, distant about 9 or 10 miles from Rosemary Island,* off the coast of New Holland, by the account of Captain Clark who discovered it, and found from 7 to 9 fathoms water close to the rocks. Captain Piddington saw this reef in 1818, and made it in lat. 20° 17′ S.

Greyhound Shoal.

GREYHOUND SHOAL, discovered by the brig of this name, bound from Calcutta to Batavia and Port Jackson, was seen 15th January 1818, at noon, while observing; the breakers bearing from S. E. ¾ E. to E. by S. ½ S. distant about 6 miles, and extending about N. E. and S. W.; an opening was perceived in the middle of the shoal, no part of which appeared above water, but the breakers were high. Our noon observation made the body of the shoal in lat. 19° 58′ S., lon. 114° 40½′ E. by lunars.

Imperieuse Shoal.

IMPERIEUSE SHOAL, discovered by Captain Rowley, December 30th, 1800, in H. M. S. Imperieuse. At day-break, saw a shoal extending about 3 miles from N. E. to S. W.; on the S. W. end shoal water with high breakers; the N. E. part a low sand, in some places covered with water, and several small rocks appearing above the surface.

As far as could be seen from the main-top, when the shoal bore from N. by E. ½ E. to W. N. W. ½ W. distant 2½ miles, the water appeared discoloured, and in many parts high breakers were observed. Noon observations made it in lat. 17° 35′ S., lon. 118° 27′ E. by *account;* no ground with 90 fathoms line. By observations of ⊙☾ eight days afterwards, the ship was about 10 miles to the westward of account.

Captain King, in his survey of the N. W. coast of New Holland, marks three shoals

Rowley Shoals.

under the name of ROWLEY SHOALS; the first, Mermaid Shoal, in lat. 17° 16′S.,

* Dampier, who named Rosemary Island, placed it in lat. 20° 21′ S. (the Belvidere's noon observations will make the island seen by her in 21° 23′ S.). Dampier says it is 6 leagues long, and 1 in breadth, with several islets about it. No water could be found there.

lon. 119° 36′ E.; the second, Minstrel and Clarke Shoals, in lat. 17° 20′ S., lon. 119° 14′ E.; and the third, Imperieuse Shoal, in lat. 17° 35′ S., lon. 118° 53′ E. There is also a coral reef in lat. 16° 30′ S., and lon. 119° 36′ E., on which the ship Lively is said to have been lost.

One of these shoals seems to have been seen by the ship Good Hope, from Banda, bound to Batavia, 14th February, 1813; when under a close-reefed main top-sail and foresail, with a N.W. wind and heavy sea, head to the S.W., saw, at ½ past 11 P.M., breakers a-head and on the lee-bow, instantly wore, and set more sail. At 4 A.M. the weather more moderate, wore, and at 8 saw the breakers from the mast-head, bearing West. At 9½ A.M. tacked within 1½ miles of the shoal, no ground 150 fathoms, it then bearing from N.N.W. to S.W. ½ S., the North eastern extreme being distinctly seen, but breakers were visible to the S.W. as far as the eye could reach from the mast-head. Several spots of dry sand appeared, and on the North end of the shoal were black rocks, on which the sea broke very high. At noon, observed in lat. 17° 47½′ S., the North extreme of the shoal bearing West about 5 miles, and we made that part of it in lon. 119° 18′ E. by chronometer, and 119° 21′ E. by an observation of the moon and Aldebaran taken 8½ hours afterwards. The chronometer was found to be very correct, when we made Christmas Island, 7th of March following.

MINSTREL SHOAL,* is said by Captain Clark, (who discovered the reef described above under this name) to bear N. 49½° E. from the North part of Rosemary Island, distant about 230 miles; when it bore East 3 or 4 miles, he made the North part of the shoal in lat. 17° 28′ S., lon. 119° 2′ E., by observations of sun and moon. Minstrel Shoal.

This shoal was seen by the Minstrel, Captain Barnes, at 4 P.M., 7th May, 1820, and at 5½ P.M. she tacked within 1½ miles of the N.E. part of the shoal, had no ground 60 fathoms; a very white sand bank, about 4 or 5 feet above water, was observed near the northernmost end of the shoal, with several black rocks to the northward and eastward of the sand bank, and the breakers from thence extended to the S.S.W. as far as visible from the mast-head. The N.E. point of the shoal, by noon observation, brought up to 5 P.M. is in lat. 17° 14′ S., lon. 118° 57′ E.; or 5° 28′ E. by chronometer, measured from the coast of New Holland, in lat. 23° 10′ S.; and by lunar observation, taken yesterday, made the same part of the shoal in lon. 118° 59′ E. This must certainly be the shoal mentioned by Captain Clark, but these observations taken in the Minstrel, make its northern extremity 14 miles more northerly than that navigator's position of the same part of the shoal.

DAMPIER SHOAL, according to the account given in the voyage of this celebrated navigator, lies S. by W. from the eastern part of Timor, in lat. 13° 50′ S. He describes it to be a small sandy bar, that shews itself on the surface of the water, surrounded with rocks, which appear 10 feet above water: it is of triangular form, and each side about 1½ leagues long; no ground at ½ a league distant from it. Dampier Shoal.

This shoal seems to be in about lon. 122° 36′ E., by Dampier's account, in a run of two days from the S.W. end of Timor.

The Cartier, in 1800, struck on a shoal, March 6th, at midnight, *apparently* Dampier Shoal. It was then blowing strong from the westward, the ship under double-reefed top-sails, "Hove all aback, and got off. While on the rock, which was 8 or 10 minutes, had 5 fathoms rocks over the stern."

* Probably one of those called Rowley Shoals, by Captain King.

"This shoal, I am led to believe," says Captain Nash, "is of great extent, as we were about 20 minutes in much smoother water, which I think was occasioned by rocks or breakers to windward (as we had a very heavy sea before and after), although not any in sight of us."

Another account adds, "That the ship, from being in a heavy sea, suddenly came in smooth water, and ran $2\frac{1}{4}$ miles before striking. Although nothing was seen above water, it is very probable there are rocks, or a sand of considerable extent, on account of the sea being so smooth."

"These rocks, we suppose, are those seen by Dampier in 1688; by observation from the preceding noon they are in about lat. 13° 58′ S., lon. 122° $20\frac{3}{4}$′ E. by chronometer brought on from last sights."

One of the journals states, that when she struck, the lon. was 122° 3′ E.; another account says, she was then in lat. 13° 57′ S., lon. 121° 55′ E. by chronometer.

Scott Reef. SCOTT REEF is probably that seen by the ship Cartier, and by Dampier: Captain P. Heywood, in H.M.S. Vulcan, gives the following description of a reef, seen by him Feb. 22d, 1801. "At noon, by account, in lat. 13° 46′ S., lon. 122° 19′ E. by chronometers, or 97 miles due East, from the position assigned to Dampier Rocks in Robertson's chart, when the man at the mast-head discovered a long range of breakers at 1 P.M. This reef on all parts is even with the water's edge, and the breakers only visible. The N.W. end is in lat. 13° $52\frac{1}{2}$′ S., lon. 121° 59′ E. From thence it extends about S. 62° E., 18 or 19 miles to the N.E. point, in lat. 14° 1′ S., lon. 122° 16′ E.; from each of these points it takes a sharp turn to the southward, but the extent of either tail in that direction, I know not, as they both broke in the mast-head horizon.

"This day, unfortunately, was gloomy, which deprived me of a sight of the sun; but the course was free, and the distance run from the preceding noon not great, the error in the log account, I think, could not have been much. The nearest land to this dangerous reef, is Red Island, on the coast of New Holland, from which it bears N. 62° W., distant 143 miles."

Captain Heywood observes, that as this *Reef* differs essentially in situation from that assigned to Dampier *Rocks* in the charts, of much greater magnitude, and not answering the description given by Dampier, he cannot say if it is the same, but thinks it should be considered as another danger, that ships may be on their guard against both. He therefore named it *Scott Reef*, after the man at the mast-head, who first saw it. There seems little reason to doubt that this and the shoal on which the Cartier struck in the night, are the same; the positions agreeing so nearly, although computed from the observations of the preceding days, and the Cartier having experienced very smooth water for a considerable time, give cause to think they are one and the same shoal.

It also agrees nearly with the position Dampier assigned to the rocks seen by him, although his description of rocks 10 feet above water, and the extent of the shoal, differs from Captain Heywood's remarks; but this difference might arise from being viewed at high and low water, as the tides rise considerably hereabout.

There are two dangers mentioned by Capt. Wickham, as having been seen by Mr. Browse, of the Lynher; the one, a reef in lat. 15° $26\frac{1}{2}$′ S., lon. 121° 55′ E., the other an island, in lat. 14° 4′ S., lon. 123° 30′ E. The latter was seen the second night after leaving Timor, with a good chronometer. It is about 1 mile in extent, and very low, so much so as not to have been discovered till within two cables' lengths, when soundings were struck in 10 fathoms; 1 mile to the westward no bottom at 40 fathoms.

SAHUL BANK and other Banks or Shoals between Timor and the coast of New Holland are imperfectly known. The Sahul Bank is projected on the charts as dangerous and rocky, of great extent, the West end of it commencing nearly due East from the South part of Rotto, and about 16 or 17 leagues from the South point of Timor; from thence stretching to the eastward upwards of 2° betwixt lat. 10° 40′ and 11° 30′ S. There is reason to think this bank is not so extensive as here mentioned, but many other coral banks, some of which are very dangerous, lie to the southward of it at a great distance; and one of these was seen in the Cartier, March 5th, 1800, the day before she struck on another shoal, which has been already described. Sahul Bank. Other banks.

The Cartier left Amboina, February 12th, 1800, with a cargo for England; she had westerly winds, and passed the end of Timor 22d: strong westerly winds prevailed when to the southward of this island. "March 5th, at 5 P.M. saw a DRY SAND BANK, bearing S. 40° W., about 4 miles; a shoal joins it to the northward, and the danger appears to be about 4 miles in circumference. We were going so fast through the water, could not heave the lead. From noon observation, it lies in about lat. 12° 29′ S., and by a good chronometer, in lon. 123° 56′ E., allowing Amboina to be in 128° 14′ E."

ASHMORE SHOAL, discovered by Capt. Ashmore, in the Hibernia, 11th June, 1811, is very dangerous and extensive:—At 4 A.M. being calm, they heard the noise of breakers, and at day-light were about a mile from the nearest part, in a deep bight at the N.E. end of the shoal, and nearly embayed. A barrier of black rocks, 6 or 8 feet above water, was observed, to the westward of which were several sand banks, with the appearance of some vegetation on the highest of them, and the surf broke violently on the S.E. point of the shoal, which seemed to extend from the N.E. point about W. ½ N. 6 or 7 miles, but its extent to the S. Westward could not be discerned for the sand banks and haze at the horizon. The water was not discoloured near the shoal; many birds rose from it in the morning, and flew towards it in the evening. The N.E. end of the shoal, by noon observation, made in lat. 12° 11′ S., lon. 122° 58½′ E. by chron. allowing the South Head of Port Jackson in 151° 25′ 25″ E., and we made 18° 57¼′ West from Booby Island to the Shoal by chron. On the 19th June, saw Christmas Island, and made it in lon. 105° 37½′ E. by chron., being then 43 days from Port Jackson. Ashmore Shoal.

HIBERNIA SHOAL, seen by Capt. Ashmore, May 8th, 1810, at 8 A.M. from the mast-head, two small sand banks, distant 5 or 6 miles to the S.W., situated upon a shoal, the breakers on which appeared to extend nearly East and West about 4 miles. The two sand banks lie near the centre of the shoal, elevated about 10 feet above water, and each appeared to be in extent about a cable's length.—At 9 A.M. the Shoal bore from S.S.E. to S.W. by S., distant about 3 miles, and some rocks were visible above water upon its western extreme. This shoal was found to be in lat. 11° 56′ S., lon. 123° 23′ E., deduced from Port Jackson by chronometer, in a run of 34 days through Torres Strait. Hibernia Shoal.

Captain P. Heywood passed over many of the banks between New Holland and Timor. January 1st, 1801, in H.M. bomb vessel, Vulcan, with three transports, under convoy, he left Amboina, and was ordered to proceed to Madras by the southern route; January 8th, owing to the indifferent sailing of the ships, and the wind veering from W.N.W. to W.S.W., he was obliged to pass to the eastward of Wetter, and next morning he passed the East end of Timor. Southern route from Amboina.

Having a strong monsoon to the southward of this island, veering between W.N.W. and W.S.W., with a heavy sea, and gaining no ground, he stretched to the southward, and on the 23d, made the coast of New Holland in lat. 15° 9′ S. This part of the coast was low, the aspect barren and sandy. An island of the colour of red ochre, named Red Island, about 5 or 6 miles from the main, was very conspicuously seen in contrast with the low land behind it, and lies in lat. 15° 9′ S., lon. 124° 22′ E.*

Red Island.

Soundings on the Sahul Bank.

On this part of the coast the soundings were regular, the bottom green ooze; at 5 leagues distance, to the N.W. of the island, 35 fathoms, deepening gradually to 60 and 70 fathoms, as far to the northward as lat. 13° 40′ S. From Red Island, with strong westerly winds, the Vulcan stood back to the northward, and at noon, Jan. 28th, saw the water discoloured a-head; immediately after, got ground 30 fathoms water on the edge of Sahul Bank; shoaled quick, and tacked in 19 fathoms; when about, had only 12 fathoms. The water was clear, and the bottom appeared white sand, with coral patches. The part where 12 fathoms was got on the southern edge of the bank, is in lat. 11° 34′ 50″ S., lon. 124° 14′ E. From this position, Captain Heywood remarks, that the western extremity of the shoal appeared to extend some miles to the W.N.W., as the water was much discoloured in that direction. To the eastward, the shoal water extended beyond their mast-head horizon, although, on the 20th January, when they tacked in lat. 11° 35′ S., lon. 125° E. no ground was obtained at 59 fathoms, nor any appearance of shoal water from the mast-head.

Other banks.

From the edge of the Sahul Bank they stood to the southward, with strong westerly winds and squally weather; on the 31st, at 9 A.M. shoaled suddenly from no ground to 15 fathoms, wore instantly, and saw the coral rocks and sand under the ship, carrying 12, 10, and 9 fathoms; when about, deepened as quick to 20, 60, and 70 fathoms. This shoal is in lat. 13° 25′ S., lon. 124° 12′ E., and on the preceding day 30 fathoms was got only 2 miles farther southward. February 2d, past 1 P.M. shoaled again suddenly from 65 into 12 fathoms, and had only 7 fathoms when about, the bottom distinctly seen, white sand and coral rocks, this position being in lat. 12° 46′ S., lon. 124° 32′ E. Being thus embarrassed between the Sahul, and these, *perhaps*, dangerous shoals, were obliged to stand to the northward, had a gale from westward, then light winds till the 6th, when the depth again decreased from 60 fathoms quick, to 20 and 17 fathoms coral. This third discovered shoal is in lat. 13° 32′ S., lon. 124° 29′ E. After tacking from it, the depth quickly increased to 70 fathoms. With constant westerly winds, beating about till the 21st, tacked in 10 fathoms, coral bottom, about 4 miles to the eastward, and 1 mile to the southward of the place of the bank discovered on the 2d. Captain Heywood observes, that between the parallels of 11° 30′ S. and 13° 40′ S., and the meridians of 124° and 125° E., is a space interspersed all over with banks of sand and coral rocks, shooting up out of deep water, the soundings near them irregular; but close to them, the bottom was generally coarse sand and bits of shells; farther off, fine white sand; and when clear of them altogether, a sort of green sandy ooze.

The positions of these banks were correctly ascertained by two excellent chronometers, corroborated at times by lunar observations. Although he saw no breakers on any of them, there can be no doubt of danger existing on some of these banks, which is rendered certain, by the Cartier and Hibernia having seen dry sand banks; and although these dangers were not seen by Captain Heywood, he must have passed within a few leagues of the shoals discovered by those ships.

* Red Island is in lat. 15°·13′ S., lon. 124° 16′ E. by Capt. King's chart.

From the observations of this correct navigator, and those made in the Cartier and Hibernia, many banks appear to exist at considerable distances from each other in the sea between New Holland and the Island of Timor, some of which are dangerous; and probably the northernmost of these banks is the Sahul Bank of the charts, not of so great extent as generally delineated.

The Bellona and Echo had also soundings on one of these banks. They left Amboina January 1st, 1798, passed to the eastward of Wetter and Timor; afterwards, with strong westerly winds, they continued to beat from January 5th, sometimes in sight of the island, till the 12th. In the Echo, at 8 A.M. rocks were seen under her bottom, and had 14 fathoms sand by the lead, the lat. 11° 16′ S., lon. 125° 50′ E. by chronometers. This, perhaps, was the eastern part of Sahul Bank, or another Bank detached from it to the eastward. From hence they had W. N. W. and N. W. winds till in lat. 14° S., lon. 121° E. the 19th; westerly and N. W. winds continued till the 31st, in lat. 17° S., lon. 115° E., then veered to S. S. W. and to South on February 3d, in lat. 17° S., lon. 110° E.

# FROM ST. PAUL TOWARDS CHINA, BY THE PASSAGES EAST OF JAVA, WITH A DESCRIPTION OF THE NORTH-WEST COAST OF AUSTRALIA.

## THE PASSAGE—COAST AND ISLANDS.

### THE PASSAGE.

THE MOST ELIGIBLE ROUTE for ships late in the season bound to China direct, if they are in the vicinity of St. Paul part of September, October, November, and December, is to proceed through some of the Straits East of Java, then enter the Pacific Ocean by Macassar Strait, the Molucca Passage, Gillolo Passage, or by Dampier Strait. From St. Paul to China.

Probably, the most preferable of these is the Ombay Passage; that is, to make Sandalwood Island, pass between Timor and the Islands to the northward of it, haul close round the East end of Ombay to the northward, and pass to the westward of Bouro, if the wind admit, or between it and Manipa; then through Pitt Passage, and enter the Pacific Ocean by Dampier Strait or the Gillolo Passage.

If late in January, or February, before a ship pass St. Paul, she ought not to enter the Pacific Ocean, but steer through Allas, or Lombock Straits, then through Macassar Strait, and between Baseelan and Mindanao, or to the southward of Baseelan into the Sooloo Sea, and along the West side of Mindanao, Panay, Mindora, and Luconia; where the winds are often favourable for getting to the northward.

It was formerly the practice in ships destined for the Straits between Java and

Timor, to make the Coast of Australia. With good chronometers, and other instruments on board for obtaining lunar observations, this is not requisite. The N. W. Cape may, in such case, be passed at any convenient distance judged prudent, according to the season of the year, and the strait intended to be taken. It must be remembered, that southerly and S. W. winds prevail greatly on the West coast, nearly from Cape Leeuwin the S. W. extremity, to the N. W. Cape; and this southerly wind is generally experienced near the shore, although at a distance from it, the S. E. trade wind may be expected at all seasons near the tropic.

Prevailing winds.

From April to November, the easterly monsoon blows along the shores of Timor, Sandalwood Island, Sumbawa, and Java; at this season, S. E. and easterly winds may be expected in the sea between these islands and the N. W. part of Australia; but in November, December, January, February, and March, when the westerly monsoon should prevail along the shores of the islands mentioned, the winds are often variable between New Holland and these islands, although generally from westward.

Ships departing from the N. W. Cape in these months, lose the southerly winds frequently in lat. 19° to 15° S., which are followed by light variable breezes at first, and afterwards by the westerly monsoon. In December, January, and February, the westerly monsoon often blows strong, with squally weather and rain, between New Holland and the islands to the northward, producing a current to the eastward. At such times, a ship should make the land to the westward of the Strait to which she is bound; and to the eastward of the same, when the easterly monsoon is prevailing.

When the westerly monsoon is expected, ships bound to Bally, Lombock, or Allas Straits, certainly have no occasion to make the Coast of Australia; but may pass the N. W. Cape at any discretional distance, and steer direct for the strait to which they are bound: if the southerly winds fail in from lat. 18° to 14° S., and are followed by the westerly monsoon, they should take care not to fall to leeward of the intended strait, for the wind is often at W. N. W., and sometimes at N. W. along the southern coasts of the islands between Java Head and Timor.

Caution.

In running across the S. E. trade, care is requisite, on account of several dangers to the westward of New Holland, and to the northward of the tropic, the true positions of which are not known.

Of making the passage.

During war, if thought unsafe to proceed through Sunda Strait, or Malacca Strait, ships bound to China, may, after passing St. Paul, run to the eastward with the westerly winds at any season of the year, not decreasing the latitude under 33° S. in winter, nor under 36° S. in summer, till they have increased the longitude 16° or 18° more easterly than the meridian of St. Paul; then edge to the E. N. E. into the S. E. trade, and pass the N.W. Cape of New Holland either in sight, or at any discretional distance. If it be the season when the S. E. monsoon prevails to the southward of the equator, and the S. W. monsoon to the northward of it, they ought not to enter the Pacific Ocean but pass through Allas Strait, or more preferably, Sapy Strait, from March to September; and by the Strait of Macassar, then through the Sooloo Sea, up the West Coasts of Mindanao, Panay, Mindora and Luconia. If danger from an enemy is apprehended on these coasts, they may, when the season is not far gone, pass to the westward of Sooloo, and enter the China Sea by Balabac Strait, then run along the West coast of Palawan, and keep at any desirable distance from the Coast of Luconia.

If a ship in the vicinity of the N. W. part of New Holland, intend to enter the Pacific Ocean by the shortest route, which is to proceed through the Ombay, and Pitt

Passage, she ought to make the East part of Sandalwood Island, and pass between it and Savu; or between the latter and Rotto, if she fall to leeward with N.W. or westerly winds. Ships formerly steered for the West part of Sandalwood Island, and passed to the northward, between it and Flores; but the route to the eastward of the island should be preferred, particularly with variable winds; nor can it be requisite to pass to the westward of Sandalwood Island, unless the wind blow strong from north-westward, with a lee-current, then it may be desirous to pass to windward. In July, a current of 15 and 20 miles in 24 hours, has been experienced to set to the westward along the southern coast of Sandalwood Island, when the wind was from eastward; at the same time, no westerly current was found near the South coast of Java.

When Captain Torin made the coast of Australia, 3d October, 1797, in the Coutts, he had, during the run from St. Paul, experienced a current of about 30 miles to the westward. When he made the coast in the Pigot, November 7th, 1780, had an easterly current of 1° during the run from the island to the coast; and an easterly set of 3° 22′, from the one to the other, when he made the coast December 9th, 1800; by which it appears, that the current runs strong to the eastward as the season advances. *Currents between St. Paul Island and Australia.*

From the N.W. Cape the fleet steered N.E. by N. 71 miles, N.E. 12 miles, had then 55 fathoms, fine sand; steered N.E. 7 miles, then 55 fathoms, and the same course six miles to noon, lat. 20° 5′ S., lon. 115° 34′ E. by chronometers, in 47 fathoms, the wind at W., December 10th.

December 11th, steered North 8 miles, in 48 to 44 fathoms; N.E. by N. 8 miles, 43 fathoms, and 4½ miles more on the same course, had then 23 and 28 fathoms; soon after, no ground at 60 fathoms, continuing the same course till noon; observed lat. 18° 54′ S., lon. by lunar observations, 116° 30′ E. From hence, had faint westerly and S.W. winds two days, then variable light breezes from N.E. to S.E. till Sandalwood Island was seen on the 19th. They entered Sapy Strait 23d, watered there, passed through Salayer Straits, Dampier's Strait, and arrived 17th February, 1801, at Macao. *Passage from N.W. Coast of Australia, by Sapy, Salayer, and Dampier Straits, to China.*

December 7th, 1801, with a southerly wind, at 10 P.M. in the Elizabeth, the coast of Australia, in lat. 22° S., was seen bearing East, distant 4 or 5 miles; they hauled off N.W., sounded, and had 55 fathoms; passed on the East side of Sandalwood Island the 17th with westerly winds; on the 21st, passed the East end of Ombay; on the 25th, between Bouro and Xulla Bessey; on the 28th between Gagy and Geby; and to the westward of Yowl Islands the 30th. Here the current set strong to the eastward; among the islands it set to the southward. This ship arrived in Canton River, January the 18th, 1802, by the Bashee passage. *By Ombay, and the Gillola passage to China.*

September 23d, 1798, the Dublin, and fleet, made the coast of Australia in lat. 21° S., had southerly winds till in lat. 15° S. on the 25th; from hence easterly winds prevailed till the 28th, when they found themselves off Banditti Island. With the easterly wind, part of the fleet worked along the South side of Lombock, and arrived at Bally Town, in Allas Strait, October 4th; sailed from this Strait the 10th, with the wind S.E.; reached Pulo Laut the 14th, and passed Cape Donda on the 19th. The other part of the fleet went through Bally Strait, watered there, sailed October 4th, passed between Pondy and Madura, cleared Cape Donda the 16th, and arrived at Macao the 15th November, by the Bashee passage. *By Allas and Bally Straits, and through Macassar Strait, to China.*

September 20th, 1798, at 10 P.M. they saw the coast of Australia, in the Caledonia, in lat. 22° S., bearing E. ½ N., distant 3 leagues; sounded, and had 42 fathoms. They had easterly winds both to the northward and southward of Sapy Strait, passed through it the 28th, and were obliged to make a tack in passing to the eastward of the Postilions, at 4 leagues distance, 30th September. On the following day, they *By Sapy and Macassar Straits to China.*

went over a coral bank of 13 fathoms in running for Macassar Strait; October 13th, cleared Cape Rivers; November 2d, saw Formosa, and arrived the 4th at Macao.

By Ombay and Dampier Strait to China.

January 13th, 1796, the Belvedere left the coast of Australia in lat. 21° S., having made a low island the day before; after leaving the coast, calms and faint westerly and N.W. winds continued two days, then light and variable winds from southward till the 24th, at making the West end of Sandalwood Island. With light westerly winds, land and sea breezes, she passed along the North coast of this island, sometimes within 3 miles of the shore, and had strong ripplings. The boat was sent to range along it in search of the watering place, but it could not be discovered. On the 5th February, she passed the East end of Ombay, and round the West end of Bouro 10th; cleared Dampier Strait 20th; saw Bottel Tobago Xima, March 17th, was delayed here four days by westerly winds: it then came at N.E. and S.E. which carried her to Macao on the 25th.

## COAST AND ISLANDS.

N. W. Cape.

NORTH-WEST CAPE OF AUSTRALIA, by the observations of Capt. Torin, of the Coutts, is in lat. 21° 50′ S., lon. 114° 26′ E. by chronometers and lunars nearly agreeing, on two different voyages; but Capt. Balston, of the Princess Amelia, in 1816, made it 2° 32′ West of Bally Town, in the Strait of Allas, by chronometer, which allowing to be in lon. 116° 33′ E., would place the Cape in lon. 114° 1′ E., which is probably nearest the truth, for Capt. King, in his minute survey of the N.W. Coast, makes the extreme point of the N.W. Cape of New Holland in lat. 21° 48′ S., lon. 114° 4′ E. This extreme point is low, from whence the land rounds to the south-westward, increasing in height, and resembles the Bill of Portland, the land near the Cape being lower than the coast more to the southward. Here the aspect is barren, without any diversity of appearance, and the land may be discerned at 7 or 8 leagues distance. A good mark in coasting along near the N.W. Cape, Capt. Torin observes, is to keep the southern extremity of the land bearing South. About 2 miles North from the extreme point of the cape lies a shoal, having a channel with 7 and 8 fathoms water between it and the point; and about 3 leagues N.E. of the Cape, are the Mairon Islands, extending 6 or 7 miles in a north-easterly direction. To the southward of the Cape, in lat. 21° 54′ to 22° 4′ S., the coast is fronted by a reef projecting 1 and 1½ miles from the shore; and it seems to have been here that a Portuguese ship was wrecked in 1816, bound from Lisbon towards Macao. The variation off the N.W. Cape of New Holland was 4° westerly in 1797. Captain King made it 2° W. in 1819.

Exmouth Gulf.

EXMOUTH GULF, on the East side of the N.W. Cape of New Holland, is 6 and 7 leagues wide, and extends southward to lat. 22° 30′ S., having many small islands in it, with shoal soundings of 12 and 10 fathoms at the entrance, to 4, 3, and 2 fathoms at the bottom of the Gulf, the coast around it barren and sandy.

Capt. Balston fell in with the coast in lat. 22° 19′ S. where it is very low, with small hummocks, no soundings 5 or 6 leagues off with 90 fathoms line; he therefore recommends to fall in with it in lat. 22° 8′ to 21° 55′ S. where the land is higher and of even appearance.

Capt. Barnes, in the Minstrel, 29th April, 1820, made the coast well to the southward of the Cape, in lat. 23° 10′ S., where the land was discerned at 7 leagues distance, then had soundings 60 fathoms, coarse yellow sand with small pebble stones.

It is certainly prudent to make the land to the southward, between Shark Bay and the N.W. Cape, where soundings are got several leagues from the shore, which may be approached within $2\frac{1}{2}$ or 3 leagues with safety: but no ship should make the land to the north-eastward of the Cape, for there are many low islands and dangerous shoals, several of which are a great distance from the coast, and very unsafe to approach in the night. Directions.

In approaching any part of this coast in the night, run towards it under easy sail, heaving the lead every hour, or every half-hour if the velocity of the ship is great, by which means, soundings will be obtained before getting near the shore.

It has been said, the never-failing guides in approaching this coast, are great quantities of skuttle-bones, weeds, and drifts; also grampusses, with an amazing number of tropic birds. These guides are, however, not always observed, as Captain Torin remarks, on making the coast, December 9th, 1800; he saw a flock of birds the day before, which is noticed, because it was the third time he had steered in for the coast, and never saw any of the birds, skuttle-fish-bones, weed, &c. Sometimes snakes may be seen on the surface of the water, when in soundings, and birds with brown wings and white bellies, resembling the lapwing in their flight; but the lead and a good look out are the best guides in approaching this coast, particularly if the longitude be uncertain.

It may be useful to give the following brief sketch of the islands and dangers, not hitherto mentioned, which are interspersed along the N.W. Coast of New Holland to the northward and eastward of the N.W. Cape, some of them at a great distance off the main land, and most of them have either been discovered or explored by Capt. King, during his arduous survey of that coast.

PIDDINGTON ISLANDS were discovered in the brig St. Antonio, January 15th, 1818, being at daylight unexpectedly within 2 miles of a long low sandy island, bearing S.E. $\frac{3}{4}$ S., then in 10 fathoms sandy bottom. The westernmost or largest island, appeared to extend about 3 or 4 leagues nearly N.W. and S.E., separated by a gap in the middle into two islands, but connected by a reef: the North point is highest, forming a bluff 50 or 60 feet above low water mark, from which a reef projects about a mile. Here Capt. Piddington landed near the reef, on a steep sandy beach, having 5 fathoms water about a cable's length off, and 7 or 8 fathoms about a mile off shore. Round the North point of the island, on its western side, the water seemed deeper, probably about 20 fathoms within $\frac{1}{2}$ mile of the beach. A few straggling bushes and tufts of sand grass, parched for want of moisture, were the only vegetation on the island, nor was there any appearance of fresh water, the soil being sandy and sterile. Piddington Islands.

There are two other islands, one of which bears about East, nearly 4 leagues from the North part of the principal island, and the other nearly East from its southern extremity; but these are mere sand banks, considerably elevated above the sea, of a tabular form. The group altogether is semi-circular, with the chief opening to the northward, and regular soundings from 13 to 7 fathoms inside, where the brig had to work out against a N.W. wind. By marks on the shore, the perpendicular rise of tide appeared to be 20 feet on ordinary springs, and at times much more. The vessel was carried speedily away from the islands by a change of tide after 6 P.M. 16th January, but the opposite tide drifted her back in sight of the bluff point of the westernmost island on the following morning.

No other land could be discerned from these islands, which lie much in the track of

ships steering from the N.W. Cape of Australia to the northward, and they are very dangerous to approach in the night.

When the Bluff Point or N.W. extreme of the westernmost island bore W.N.W. 3 miles, the observations at noon made it in lat. 21° 36′ S., lon. 114° 56′ E. by chronometer, or 1° 37′ W. from Bally Town, in the Strait of Allas, and 54 miles West from the body of the westernmost Rosemary Island.

Rosemary Islands.

ROSEMARY, OR MONTEBELLO ISLANDS, seen by Captain Piddington, appear to consist of two principal low sandy islands, having several gentle risings, the highest part of which is the N.E. extremity of the Eastern Island, and this island extends about 10 miles in a N.N.E. and S.S.W. direction. The Western Island extends about 12 miles nearly N.E. by N. and S.W. by S. and they appear separated 8 or 9 miles at the nearest parts: but a reef projects nearly 3 miles from the North end of the eastern Island, and from thence extends to the North end of the western Island, admitting of no safe passage between them, as the open space seemed to be occupied by shoal water, as far as the eye could discern. To the southward of the two principal islands, lie two small islets of black aspect, resembling quoins, with a small black Table Island outside of them; the islands seemed very sterile, formed of variegated sand hills, and probably destitute of fresh water. The tides are strong, and appear to rise about 20 feet perpendicular on the springs. By noon observation, made the N.E. point of the eastern Island in lat. 20° 26′ S. North extremity of the western one in lat. 20° 35′ S. by meridian altitude of the moon, and the latter made in lon. 115° 30′ E.* by observations of sun and moon, and 115° 50′ E. by chronometer, or 43 miles West of Bally Town, in the Strait of Allas. The eastern island is about 10 miles East of the meridian of the western one.

These Islands, called by Captain Piddington Rosemary Islands, are no doubt the group examined by Captain King, during his survey of the N.W. Coast of Australia, and named by him MONTEBELLO ISLANDS, extending from lat. 20° 21′ S. to 20° 27′ S., lon. 115° 30′ E.; and BARROW ISLAND, from lat. 20° 40′ S. to 20° 53′ S., lon. 115° 22′ E. to 115° 30′ E.

Dampier Archipelago.

DAMPIER ARCHIPELAGO,† by Captain King's survey, extends from lat. 20° 19′ to 20° 30′ S., lon. 116° 0′ to 117° 7′ E., situated near the coast, having shoal soundings amongst these islands from 7 to 3 fathoms. From hence to the N.W. Cape the coast is fronted by a broken chain of small barren sandy islands, having shoal soundings near most of them, and also between them and the main land.

Proceeding to the north-eastward from Dampier Archipelago, the next prominent part of the coast is Cape Levèque, the North point of Dampier Land, in lat. 16° 22′ S., lon. 122° 57′ E. Dampier Land is about 110 miles long from N.N.E. to S.S.W., and was supposed by some to be an island, but the survey of Captain Wickham has proved it to be part of the main land. Off it, at the distance of 12 or 14 miles are the Lascepedes Isles, in lat. 16° 51′ S., lon. 122° 9′ E., and farther out, the Baleine Bank, in lat. 16° 46′ S., lon. 121° 50′ E.

To the eastward of Cape Levèque is the group of islands called the Buccaneer Archipelago, fronting a deep gulf, at the head of which Captain Wickham has recently

* This is probably nearest the truth, corresponding almost with Capt. King's longitude of these islands.

† One of the western islands of this Archipelago is called Rosemary Island by Capt. King, which name seems to have been applied by different navigators who have seen them to several of the islands off this part of the Australian Coast.

discovered a River, which he has named Fitz-Roy, after his former commander. Outside Buccaneer Archipelago is Adele Island, having several small islets near it, all low and sandy. The centre of Adele is in lat. 15° 30′ S., lon. 123° 11′ E. About 26 miles N.E. by E. from Adele Island lies Beagle Bank, an extensive sand, 4 or 5 miles in length, N.W. and S.E., having part of it dry. The dry part is, by Capt. Wickham, in lat. 15° 19′ S., lon. 123° 35′ E.; there is uneven ground between the island and the bank.

BRUNSWICK BAY, in about lat. 15° 14′ S., lon. 124° 45′ E., is of considerable extent, forms the entrance of Prince Regent River, which river seems, by Captain King's survey, to have good depths of water for ships, with a rise of tide about 20 to 24 feet on the springs, and it is fronted by an archipelago of islands, forming several bays or harbours, Brunswick Bay being the outermost, open to North and N.W. winds. Fresh water can be got at a rivulet on the West side of the entrance of Prince Regent's River, at the bottom of Hanover Bay, which forms the south termination of Brunswick Bay. Brunswick Bay.

YORK SOUND, in lat. 14° 55′ S., lon. 125° 10′ E., forms the entrance of Prince Frederick Harbour, into which flow Roe and Hunter Rivers. York Sound.

ADMIRALTY GULF, in lat. 14° 10′ S., lon. 126° E., forms the entrance of Port Warrender. Admiralty Gulf.

VANSITTART BAY, in lat. 14° 5′ S., lon. 126° 17′ E., is separated from Admiralty Gulf by a peninsula. Vansittart Bay.

CAMBRIDGE GULF, entrance, in lat. 14° 40′ S., lon. 128° 15′ E., fronts the mouth of a river which extends S.S.W. to lat. 15° 35′ S. Cambridge Gulf.

CAPE VAN DIEMEN, in lat. 11° 8′ S., lon. 130° 20′ E., is the N.W. point of Melville Island, which extends from lat. 11° 8′ S., to 11° 56′ S., and from lon. 130° 20′ E. to 131° 30′ E., and, with Cobourg Peninsula to the eastward, forms Van Diemen Gulf, having two large openings, one between the above-mentioned island and peninsula, the other called Clarence Strait, round the West and South sides of Melville and Bathurst Islands. The Strait is studded with small isles, rocks, and reefs, having rapid currents between them: these two islands are separated by a narrow channel, called Apsley Strait, forming a good harbour, named Port Cockburn, with moderate depths of water. Cape Van Diemen.

PORT COCKBURN was established as a British settlement,* in 1824, by Capt. Sir Gordon Bremer, of H.M. ship Tamar, who took formal possession of the North coast of New Holland, comprehended between the meridians of 129° and 135° East longitude, and the following directions have been given for vessels proceeding to the new settlement. Port Cockburn.

On approaching the North part of Apsley Strait, care is requisite to avoid the Mermaid Shoal, which extends to the westward of Cape Van Diemen about 5 leagues. Piper Head, a steep and remarkable red and white cliff, a little to the southward of Cape Van Diemen, being brought to bear East, and kept on this point, will lead a

* This settlement, and others attempted to be made on this part of the coast, has been relinquished, chiefly on account of the scarcity of fresh water, and the sterility of the soil.

vessel into the narrow part of the entrance, which is about 2 miles wide; then the lead should be kept going, with a good look out, the soundings being generally from 5 or 6, to 9 or 10 fathoms. From hence an E.S.E. course will carry her into St. Asaph Bay, which is spacious, with good anchorage, where ships may stop, until they communicate with the settlement, which is about 4 leagues farther down the strait.

The flag-staff of Fort Dundas, in Port Cockburn, is in lat. 11° 25′ S., lon. 130° 24′ E. The tides are strong, especially in the springs; and the flood sets to the southward.

Kings Cove, another good harbour, is beyond Port Cockburn, farther into the Strait.

Port Hurd.

PORT HURD, in lat. 11° 40′ S., lon. 130° 12′ E., situated on the North side of the S.W. point of Bathurst Island, is a snug harbour, with moderate depths for anchorage. Alligator Rivers, two in number, fall into the S.E. part of Van Diemen Gulf, and by Capt. King's chart, the westernmost seems a fine river, navigable for ships of large size; and all these rivers have a great rise and fall of tide, from 19 to 22 or 24 feet on the springs, the velocity of the stream from 2 to 3 or 4 miles per hour.

Port Essington.

PORT ESSINGTON,* is a deep inlet on the North side of Cobourg Peninsula, which projects N.N.W. about 50 miles from the main-land of Australia. The entrance is about 7 miles wide between Point Smith on the East side, and Vashon Head, on the West, and it extends generally in a S.S.E. direction, 17 or 18 miles, with depths of water from 12 to 5 fathoms. Off the Port, about 4 miles N.W. by N. from Point Smith, and 5 miles N.E. from Vashon Head, lies the Orontes Reef, on either side of which the Port may be safely approached. The average breadth of the inlet is 5 miles, and at its southern end, three spacious harbours are formed, each extending 3 miles inwards, and about 2 miles wide, with 5 fathoms water, over a bottom of stiff mud and sand. These harbours are sheltered from every wind, and afford safe anchorage for vessels of any description, being free from hidden danger. Including the whole of these, Port Essington forms one of the finest harbours in the world, and may at all seasons be entered by night as well as by day. It is an eligible place of resort for vessels proceeding from Sydney, through Torres Strait, towards Java, Singapore, and India; and from its contiguity to Timor, New Guinea, Celebes, and the other islands of the Indian Archipelago, it is accessible to the Malay and Bugis trading proas, as also to the junks from China, in consequence of the regular monsoons, which extend several degrees to the southward of it.

The settlement of Victoria, recently established by Captain Sir Gordon Bremer, is near the head of the inlet, on its West side. The following directions for Port Essington are given by Mr. J. Jackson, master of Sir Gordon's ship, the Alligator.†

Ships coming from Torres Strait to Port Essington, after passing about 10 miles to the northward of Cape Wessel, should steer a course that would carry them about the same distance North of New Years Island, which is in lat. 10° 55′ S., and lon. 133° 1′ E.; from thence a course that would take them at least 12 miles to the northward of Cape Croker, for there is a dangerous shoal, not laid down in Capt. King's charts, with less than 10 feet water on it, about 7 miles to the northward of that Cape, on which two ships have lately struck. There is a channel between this shoal and the Cape, but it cannot be recommended to strangers as a safe passage, for its breadth and soundings are not yet known.

* This port, Raffles Bay, about 4½ leagues to the eastward, the adjacent places of shelter, the aspect and state of the proximate country, and also the shoals or dangers contiguous, are fully described in the Journal of the Royal Geographical Society, vol. iv. part 2nd, 1834.

† See *Naut. Mag.* for 1840, p. 1.

Having brought Cape Croker to bear South, distant at least 12 miles, a direct course should be steered for Point Smith, which is the East point of the entrance to Port Essington. This point is low and sandy, it should be rounded at the distance of $1\frac{1}{2}$ miles in 9 fathoms, to avoid a reef extending in a W.N.W. direction from it, but which generally shews itself. By borrowing on Point Smith, as above directed, and avoiding the mid-channel, ships will keep clear of a very dangerous shoal, now named Orontes Reef, from the ship Orontes of London, having struck on it on the 18th of December, 1838. This ugly reef lies nearly in mid-channel, and has only 5 feet on the middle of it at low water springs. The following compass bearings are taken from it. Vashon Head, S.W. by S. 6 miles; Point Smith, S.E. by S. about 6 miles, and Turtle Point, S.S.E.

After rounding Point Smith in 9 fathoms, steer S. by E. $\frac{1}{2}$ E. 13 miles, and you will be abreast of Point Record, which is low and sandy, but steep to. In that track will be found 9, 8, 7, 6 and 5 fathoms at low water spring tides, muddy bottom.

Working in after passing Point Smith as above directed, ships may stand in on either side to about $\frac{3}{4}$ of a mile off shore; remembering always that Turtle Point and Oyster Head on the West side, and Rocky Point, Table Head and Observation Cliff, on the East, are all foul. Off the latter, in a N.W. direction, lies a rock which dries at half tide, and is $\frac{3}{4}$ of a mile off shore. This cliff may be known by its being the northern extremity of the southernmost red cliff outside Point Record. Off Table Head lies the Tamar Rock, but it is quite out of the way working in. When off Point Record the water will deepen to 10 or 12 fathoms, at less than a cable's length from the point. Great care should be taken in passing between Point Record and the opposite shore, called Spear Point, for the distance across is only 1 mile, and a very dangerous bank, with rocks at its S.E. extremity that dry at low water, stretches nearly half way across from Spear Point. To avoid this shoal, all ships should pass about a cable's length off Point Record, steering about S. by E. until $\frac{1}{2}$ a mile to southward of the point. A course S.S.W. from thence, allowing for tide, will carry them to the anchorage of Victoria. In that track will be found 7, 6, 5, 4, and 3 fathoms at low water spring tides, muddy bottom, the distance being about $2\frac{1}{4}$ miles. Working up to the anchorage of Victoria from Point Record, being well clear of the shoal off Spear Point, stand to the eastward till Point Record bears North. By not standing farther in, a shoal will be avoided, which runs more than a mile North of Middle Head, in standing to the westward, tack on the first shoal cast.

The settlement of Victoria is on the Western shore, and may be known by the promontory on which it stands, being the highest piece of land on that side the harbour. The northern part of this promontory is now named Minto Head, and is in lat. 11° 21′ 45″ S., lon. 132° 8′ E.; its height from the level of the sea is about 75 feet. The southern part is a remarkable red cliff, the one inside Point Record, and it can be seen more than 2 miles outside that point, and will always be a good leading mark to the anchorage off the settlement. With a leading wind, steer directly for it, when inside Point Record.

The best anchorage for ships not drawing more than 16 feet water, is with Minto Head bearing W. $\frac{1}{2}$ N., Point Record, N. by E. $\frac{1}{2}$ E., and the end of the red cliff S.W. $\frac{1}{2}$ S., in 3 fathoms low water on a muddy bottom. This anchorage is only half a mile off a very good pier, which has just been built, where all cargoes may be landed with convenience and safety.

Ships of greater draught should anchor about a mile and a half to the N.N.E. of

Tide. the above berth. It is high water at full and change, at 3h. 24m. P.M., the rise and fall at spring tides, 13 feet, but the neaps are very irregular; the floods run to the southward, the ebbs to the northward.

Excellent water and wood can be obtained in abundance. The soil is of first-rate quality, and the climate extremely healthy.

There is now a good survey of Port Essington by Mr. Tyers of H.M.S. Alligator, who makes the pier at Victoria in lat. 11° 21′ 53″ S., lon. 132° 12′ 27″ E. Variation 1° E. (1839.)

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# ISLANDS TO THE SOUTHWARD AND SOUTH-EASTWARD OF JAVA, THE ADJACENT STRAITS AND SOUTH COAST OF JAVA, WITH DIRECTIONS TO SAIL FROM ST. PAUL ISLAND TO THE STRAIT OF SUNDA.

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## ISLANDS TO THE SOUTHWARD AND SOUTH-EASTWARD OF JAVA.

THE KEELING OR COCOS ISLANDS are in two distinct divisions lying North and South of each other, and having a channel between them about 15 miles wide.

The northern division consists of one island only, while in the southern one the islets are numerous. They were not much known previous to the visit of Captain J. C. Ross of the ship Borneo, who partially refitted his ship at the southern group in 1825, and who is now settled there. He distinguishes this group by the name of the BORNEO CORAL ISLES, restricting the name of Keeling to the northern island. The harbour first named by him Port Refuge he now calls Port Albion, and he has given the name of New Selma to the village where he has fixed his residence, with his family; he has several followers, amongst whom are a smith and a carpenter. Captain Ross, has lately ascertained, that these isles extend from lat. 12° 4′ to 12° 14′ S., being 10 miles in length from North to South, and about 7 miles in breadth from East to West.

Ships, homeward-bound, after clearing Sunda Strait and Java Head, are liable to sustain damage, whilst carrying sail with the S.E. trade-wind, against a heavy swell from the S.W.; and as Port Albion is situated nearly in the direct route of these, and also of ships outward-bound to the west coast of Sumatra, or the eastern parts of the Bay of Bengal, late in the season, Captain Ross thought, that the forming of the settlement of New Selma, might be of great importance to the commerce of the British Empire, and to general navigation, by affording a harbour of refuge for ships

to repair damage, or to refresh their people, if scorbutic, with coco-nuts and good water. Some time hence, hogs and poultry may easily be reared. His expectations have been already in some measure realized, for several ships have touched at Port Albion, to repair damage, or procure water and refreshments.

New Selma has been found a healthy place; the trade-wind blows constantly with more or less strength, varying occasionally between South and E.N.E.; the showery season is from January to July, but slight showers fall at other times. The current usually sets to north-westward, sometimes from 1 to $1\frac{1}{2}$ mile per hour; and the range of the thermometer is between 73° and 84°.

Directions.

A ship intending to stop at Port Albion, if uncertain of her longitude, ought to get into lat. 12° 10′ S., at a reasonable distance to the eastward of the Coral Isles, and proceed to the westward on that parallel until their eastern part is seen, then steer for the north-easternmost island of the chain, called Direction Island, and round it on the western side within a $\frac{1}{4}$ mile, to give a berth to the reef that extends from the island on the N.W. side of the harbour's entrance, and then be ready to anchor in from 10 to 7 or 6 fathoms water, when Direction Island bears about East or E. by N., as the bank of soundings is very steep, there being only $3\frac{3}{4}$ fathoms when this island bears about N.E. If unprovided with a chain-cable, a spot of sandy ground ought to be chosen for anchorage, as there are many rocky patches; and afterward, the ship may be warped into the deep water basin inside of Direction Island, or piloted up the harbour by an experienced person belonging to the settlement of New Selma, where wood and water may be obtained.

Capt. Fitz-Roy examined these islands in 1836, and thus describes them. "The southern group is a cluster of islets encircling a shallow lagoon, of an oval form, about 9 miles long and 6 wide. The islets are mere skeletons, little better than coral reefs on which broken coral and dust have been driven by the sea and wind, till enough has been accumulated to afford place and nourishment for thousands of cocoa palms. The outer edges of the islands are considerably higher than the inner, but nowhere exceed about 30 feet above the mean level of the sea. The Lagoon is shallow, almost filled with branching corals and coral sand. The northern group consists of one small island, about a mile in diameter; a strip of low coral land surrounding a small lagoon, and thickly covered with coco-nut trees."

They were seen by Capt. Fitz-Roy at the distance of about 16 miles, as a long but broken line of cocoa palm trees, and on a nearer approach, a heavy surf breaking upon a low white beach, which was all that could be discerned till within five miles of the larger Keeling, when the low islets which compose the group, were made out.

"We picked our way," says Capt. Fitz-Roy, "into Port Refuge, the only harbour, passing cautiously between patches of coral rock clearly visible from the mast head, and anchored in a safe, though not the best berth. An Englishman (Mr. Leisk) came on board, and guided by him we moved into a small but secure cove, close to Direction Island. Soundings on the seaward side of the islands could seldom be got, but as they were obtained two miles North of the larger island, it may perhaps be inferred that the sea is not so deep between the two, as it is in other directions. Only a mile from the southern extreme of the South Keeling, no bottom could be got with more than 1,000 fathoms of line." Direction Island is in lat. 12° 5′ S., lon. 99° 55′ E., var. 1° 12′ W. (1836). High water at 5h. 30m.; rise 5 feet. The northern island is in lat. 11° 50′ S., lon. 96° 51′ E.

Captain Ross has already cultivated with success abundance of maize, pumpkins,

&c.; poultry is thriving, and will soon become numerous. Turtle, at present, are plentiful, and easily obtained. On Scott Island, the principal station of the new settlement, fresh water is good and abundant, but as this upper part of the harbour is shoal, there is an inconvenience in conveying water to ships at the outer anchorage, to remedy which, the construction of a wharf and receptacle for tanks has been commenced, where Captain Ross intends to keep a ready supply. And if his expectation of being frequently visited by ships in want of refreshments or repairs be realized, it is his intention to provide an assortment of anchors and cables, to meet any casual deficiency. Captain Ross being a ship-builder and mariner, and having a few mechanics under him, a vessel in distress may, under his superintendence, be assisted, or hove down, and receive any repairs which are not of great magnitude.

Christmas Island.

CHRISTMAS ISLAND, about 3 leagues in length each way, of square form, may be seen 12 leagues off in clear weather, it abounds with trees, many of which are said to be coco-nut and limes.

Captain G. Richardson, in the Pigot, endeavoured to find anchorage at this island in 1771; two boats were sent to examine it, but they could find no place where a ship might anchor, during a search of two days, sounding round the island. All round, it was found steep to, with 95 fathoms within a cable's length of the shore; and the only accessible part they discovered was at the N.W. part of the island, at a small white beach, resembling sand, but formed of white stones and coral, where they landed, and got a number of land-crabs and boobies. Some wild hogs were seen, but they could find no runs of water.

The ship Earl Wycombe, made the body of the island in lat. 10° 34′ S., lon. 105° 33′ E., by good observations. Lieutenant Davidson, in the brig Waller, made it in lat. 10° 32′ S., lon. 105° 33′ E. by ⊙ ☾. Captain L. Wilson, a very correct observer, made the North end in lat. 10° 27′ S., and the body in lon. 105° 33′ E., or 19¼ miles E. from Java Head by chronometer to the West end of the island. The Lascelles, by chronometer, made it also in lon. 105° 33′ E.

These observations nearly correspond with each other, and with those made in the Asia, by Mr. William Stone, in July, 1805. This ship, in proceeding from China to Bombay, by the eastern passage, sailed close to Christmas Island; observations by ⊙ ☾ agreed nearly with the chronometers, one of which was excellent. Sights taken with the island South, made its centre in lon. 105° 34′ E. The whole of the observations for latitude and longitude taken in the Asia, made Christmas Island extend from lat. 10° 27′ to 10° 35′ S., and from lon. 105° 29′ to 105° 39′ E., which position has been corroborated by the observations of other ships since that time.

Sandalwood Island.

SANDALWOOD ISLAND, called Jeendana by the natives, being the Malay name for sandal, is of middling height; near the West point of the island there is a peak, which can be seen about 20 leagues distance, and in most parts the South coast may be discernible at the distance of 9 or 10 leagues. It extends about W. by N. and E. by S.; the West end called Bluff or Breaker Point, on account of some breakers projecting from it, is in about lat. 9° 42′ S., lon. 119° 10′ E.,* and the East end of the island in lon. 120° 46′ E., by mean of several ships' observations. The N.W. or

* His Majesty's ship Satellite, in June, 1828, made Bluff Point 3 or 4 leagues more to the eastward; and New Island she made in lat. 10° 46′ S., lon. 121° 40′ E. by chronometer.

northern extremity is in about lat. 9° 15′ S.; and the southern extreme in about 10° 22′ S., lon. 120° 20′ E. Near Bluff Point there are soundings from 30 to 60 fathoms, at the distance of 3 or 4 miles from the shore; when this point and the S.W. end of the island were in one bearing, S. 39° E., the extremity of the breakers bore S. 32° E. and the peak S. 75° E. The West end of Sandalwood Island bears about S.S.W. from the entrance of Sapy Strait.

The South point of Sandalwood Island is separated from the body of the adjacent land by a low isthmus terminating in a peninsula, almost as high, and apparently as inaccessible as the Rock of Gibraltar, with a spacious bay on each side of it, particularly that on the West side, which seems well sheltered from the S.E. monsoon, by the islands contiguous to the isthmus. No soundings are obtained at 3 or 4 miles distance from the shore.

Between Sandalwood Island and SAVU, the channel is wide and safe, the body of the latter being in lat. 10° 37′ S., lon. 122° 0′ E. by lunars, agreeing with chronometers in a run of six days from Amboina, by Captain Heywood's observations, or 6° 15′ W. from Amboina flag-staff. Savu may be seen 7 or 8 leagues distance from a ship's deck. BANJOAN, situated near its S.W. end, is low and woody. NEW ISLAND lies 13 or 14* leagues to the westward in lat. 10° 40′ S., about lon. 121° 3′ E.; which is described in H.M.S. Satellite's journal, as a White Rock, about 3 quarters of a mile in extent N.E. and S.W., about 40 feet elevated above the sea at the North end, which is the highest part, where a black patch in the form of a shoe forms the summit. Reefs equal to the length of the island project from both its extremities, and in passing within a mile of the western side, no ground was got with 75 fathoms line.

Savu.

Banjoan and New Island.

STRAITS OF ALUER, PANTAR, SOLOR, AND FLORES, between Ombay and the Island Flores or Mangerye, are not much frequented by English ships: if the Ombay passage be not preferred, they generally proceed through some of the straits to the westward of Flores, as those to the eastward are narrow, with strong tides in them.

Straits between Ombay and Sapy.

SAPY STRAIT has been much used, but ships intending to pass through Salayer Straits in the westerly monsoon should not choose it, for they may find great difficulty in weathering Salayer, if the W.N.W. winds blow strong with a lee current. This frequently happens during the strength of the westerly monsoon, which makes Allass Strait preferable in this season, it being farther to windward.

Sapy Strait.

Ships steering for Sapy Strait, with light, variable, or easterly winds, may fall in with the West end of Sandalwood Island; but with westerly winds, which blow strong, with a lee current, the South coast of Sumbawa should be approached. This coast extends nearly in the parallel of lat. 9° S. upwards of 50 leagues, and is mostly high land, except near the middle of it, where there is a low point covered with trees, opposite to the bottom of the great bay, which indents the North side of the island, and nearly cuts it in two.

Sapy Strait, at the entrance from the southward, is about 4 leagues wide, formed on the East side by the Island Comodo, which is high, and to the westward by the S.E. end of Sumbawa, and the islands contiguous. The S.E. end of Sumbawa, by recent observations, is in about lat. 8° 42′ S., lon. 119° 14′ E., having rugged islands at a

Sumbawa.

* The Satellite's journal states it to be only 7 or 8 leagues to the westward of Savu.

considerable distance to the westward, and the Camara Islands on the East side, several of which are small islets.

From the entrance of Sapy Strait, in clear weather, the peak on Sandalwood Island is visible, bearing S. 2° W. Wood and water may be always procured at Sapy, or in the bays near it.

Allass Strait.

ALLASS STRAIT is safe, much frequented, and may be easily known in coming from the southward, the S.W. end of Sumbawa, which bounds it to the eastward, being high rugged land; whereas, the S.E. end of Lombock, forming the West side of the entrance of this Strait, is composed of steep cliffs facing the sea; the land here appearing low and level, at 5 or 6 leagues distance. The S.W. end of Sumbawa is in about lat. 9° 2′ S., lon. 116° 42′ E., from observations I made in 1796, by ⊙ ☾ * and chronometers, to construct a plan of the Strait of Allass, which agree exactly with those of the Boddam and Asia, by ⊙ ☾ and chronometers. The S.W. end of Sumbawa extends about $3\frac{1}{2}$ or 4 leagues more to the southward than the S.E. end of Lombock; and the breadth of the channel from this point to the Sumbawa shore is about 3 leagues. A ship should borrow towards Lombock, there being soundings near the S.E. point, and along the shore of this island throughout the Strait: but the Sumbawa shore is steep to. Near the pitch of Lombock Point, there is a rock high above water, distant about half a mile from the shore; and several rocky islets near the steep cliffs to the westward of the point, outside the entrance of the Strait. At Bally Town, and at Segar, which are both on the Lombock side of the Strait, water and other necessaries are procured.

Lombock Strait.

LOMBOCK STRAIT, formed by the Island Bally to the West, and that of Lombock to the East, is about 13 leagues W.N. Westward from the S.E. point of the latter island.

Between the Straits of Lombock and Allass, the South coast of Lombock is indented by several bays or inlets, one of which lies a few leagues eastward of the S.W. point of the Island, having some rocks near its West point, 2 or 3 miles from the shore. The South entrance of Lombock Strait is easily known, the large Island Banditti lying nearly in the middle of it, which has a level contour resembling a table, with a small knob or peak on the East end, when seen from southward: and the cliffs facing the sea, are steep like the Forelands.

The common channel into the Strait is to the eastward of Banditti Island; but the passage between this island and the Bally Shore, is sometimes used by the eastern traders.* The Cirencester, during a calm, was horsed between Banditti Island and the islands close to the West side of it, by a rapid current or tide, during the night. The channel was so narrow, they thought the ship would touch against the steep shores on either side, which appeared over the tops of the masts, although no soundings could be obtained. She was carried through this critical gut by the strong currents or tide, fortunately without damage. Ships should, however, avoid the West end of Banditti Island, and not approach the islands near it, particularly with baffling winds.

Rapid Tide or current.

In clear weather, Lombock Strait may be easily distinguished from the others, when the Peaks of Bally and Lombock are visible, at 7 or 8 leagues distance from the entrance. Bally Peak, situated at the East end of the island of this name, is a sharp

* Captain Ashmore went twice through this passage in the brig Emily, and represents it safe, with soundings in some places within three miles of the Bally shore, which is low near the sea, opposite to Banditti Island.

pointed mountain, and is in the centre of the opening of the Strait bearing N. by W.; same time, Lombock Peak, bearing N.E. ½ N., appearing double in this view, is seen topping over the western high land of the island. This peak is situated near the North end of Lombock, and bears N.N.W. from the entrance of Allass Strait. It may be seen near 30 leagues distance in clear weather.

In entering Lombock Strait, a ship should keep mid-channel between Banditti Island and Lombock, and afterwards nearest the eastern shore; this will prevent her from being set towards the North shore of Banditti Island, if the winds be light, and the tide of ebb make to the southward after she has entered the Strait.

The tides are rapid with strong eddies, and no bottom in the fair channel in passing through. From the best accounts, Banditti Island is in lat. 8° 46′ S., and in about lon. 115° 15′ E. Banditti Island.

BALLY STRAIT,* between the island of Bally and the East end of Java, is 5 or 6 leagues wide at the entrance from the southward, and 14 or 15 leagues to the West of Lombock Strait. Table Point, and the other land of Bally on the East side of the Strait, is higher than the East end of Java, which is an even piece of land, resembling Banditti Island, sloping down at each end when viewed from the southward at 6 or 7 leagues distance. The S.E. point of Java is in lat. 8° 46′ S., lon. 114° 33′ E. by mean of several ships' observations, of moon and chronometers. Bally Strait. Java, S. E. point.

From February to September, as southerly winds generally prevail near the South coasts of the islands which form these Straits, a ship should then, at leaving the S.E. trade, be nearly on the meridian of the Strait through which she is to pass, and steer North for it. After losing the S.E. trade, the winds may often be found variable, but generally between S.S.W. and S.E. near the islands. To approach the Straits eastward of Java.

If, on drawing near them, the wind incline far to the eastward, she must keep a little to windward of the entrance of the intended Strait, for the current will probably set to the westward.

From November to March, strong westerly winds may frequently be expected, which produce an easterly current, setting along the South coast of Java, and the islands to the eastward. She ought, therefore, in this season, to keep a little to the westward of the entrance of the Strait intended to be used, particularly if the wind incline to the westward as she approaches the land.

THE SOUTH COAST OF JAVA extends from the entrance of Bally Strait nearly W. by N. to Wine Cooper Point, excepting in several places, where bays or inlets cause a deviation from this general direction. On most parts of this coast there are soundings near the shore, and anchorage in several bays, over a bottom generally black sand; but they are seldom visited by strangers. South coast of Java.

VLEER MUYS (Flying Mouse) BAY, about 8 or 9 leagues eastward of Noesa Baron, seems to afford no shelter, the shores being rocky, the water too deep for good anchorage, and the Bay much exposed, having in it some islands. Vleer Muys Bay.

NOESA BARON, in lat. 8° 38′ S., lon. 113° 35′ E.† distant from the coast 3 or 4 Noesa Baron.

* A ship from Sourabaya, bound to New South Wales, said to have been captured by 16 Praws in Bally Strait, in 1834, and all her crew murdered, shows the necessity of having the guns always clear for action, to repel any attack made by these cruel wretches upon small ships proceeding through any of the Straits, or amongst the islands to the eastward of Java.

† Some persons have made it about 4 leagues more westerly.

leagues, is an island about 7 or 8 miles in extent East and West, of low and level appearance, presenting a front of bold cliffs on the South side, with a high surf beating against them; all the other isles or rocks on this coast lie much nearer the shore. About 7 leagues to the eastward of Noesa Baron, far inland, Moneroo high Peaked Mountain is situated, which may be seen when coasting along in clear weather. There are soundings of 40 to 25 fathoms between Noesa Baron and the main, where shelter might be found under the Island from southerly winds, in a case of necessity.

Tangala Isles. TANGALA ISLES are small, three in number, situated near each other, and appear joined together when viewed from the westward, but separated when seen from the southward: the central, or largest isle, is in lat. 8° 26′ S., lon. 112° 26′ E. by chronometers, and is on with a remarkable hill bearing N. ½ E. To the westward of Tangala Isles there are two remarkable hills near the sea.

Pachitan Bay. PACHITAN, or PATEJETAN BAY, in lon. 111° 6′ E., *is said* to afford shelter from all winds, in depths of 9 to 13 fathoms black sandy bottom, although there is generally a heavy surf beating against the shore at the bottom of the bay. The course into this bay is about North, having 40, 30, to 25 fathoms in the entrance, which is 1 or 1½ miles wide, opening inside into a circular basin or bay.

Turtle Bay. TURTLE BAY, in lat. 7° 48′ S., separated from Maurice Bay by the Island Kambangan, or Cambangan, distant about 7 leagues from the latter Bay, seems to be well sheltered from westerly winds by the island mentioned, where ships may lie in 7, to 8, or 9 fathoms, fine black sand; and the eastern side of this Bay affords shelter from easterly winds. The Strait that separates Cambangan from the main is narrow, with soundings of 20 to 3 fathoms, the eastern entrance being called the Eastern Harbour, having depth of 7 to 4 fathoms, by keeping close to the island. The other entrance of Western Harbour is rocky, with a winding channel, and the Island Noesa Waru at the South part of it.

Penanjong Bay. EAST PENANJONG BAY, called Maurice Bay by the Dutch, in about lon. 108° 30′ E., is formed by a peninsula on the West side, and on the East side by the Island Cambangan, mentioned above, which island extends about 6 leagues from W.N.W. to E.S.E.; the Strait that separates it from the main communicates with a large inland lagoon, called Segara Anakan Bay. Penanjong Bay affords good shelter in the westerly monsoon, also fresh water easily obtained, and other refreshments may be got, as appears by the journal of the Company's ship Anna, bound to Bencoolen, which ship anchored here in 7 fathoms black sand, on the 24th of December, 1703, and moored with the extremes of the land from E.S.E. to S.S.E. ½ E., the latter being the S.W. point of the Bay. She struck her top-masts, examined her rigging, wooded and watered, obtained rice, some buffaloes, fruits, and vegetables in this bay, and sailed from hence on the 10th of January, 1704, for Bencoolen.

When entering Penanjong Bay, a rock perforated like the arch of a bridge will be discerned, also three rocks in a line like three sugar-loaves: there is no danger, the soundings decreasing gradually till within a mile of the shore, where a ship may anchor, or nearer if requisite. Fresh water is easily got in a small sandy bay.

WEST PENANJONG BAY, or CHIKAMBULAN BAY, called Dirck Vries Bay by the Dutch, situated in about lat. 7° 50′ S., is separated from the Bay last de-

scribed by a peninsula projecting into the sea. This Bay also affords shelter from the westerly monsoon, where refreshments may be got, but not fresh water, without great difficulty.

The Anna anchored here in 11 fathoms fine black sand, on the 11th of December, 1703, with the western extreme of the land bearing S. ½ W., the eastern extreme E. by N., and a mountain, probably Tegal Hill, N. E. by E., appearing like a sugar-loaf, high over the other land. Here she remained till the 24th, and finding the natives friendly, got timber for spars and fuel, plenty of rice, fowls, vegetables, some buffalo beef; abundance of fish may be caught in the sandy bays, but she was obliged to proceed for Penanjong Bay to fill up her water.

The land on the South coast of Java is not easily known, the alternate high and low lands having a similar appearance in coasting along. From the West part of the last-mentioned Bay, the coast stretches about W. by N. to Wine Cooper Point; it then takes a direction northward and north-eastward, to the parallel of 7° S., by which an extensive concavity is formed, called Palatasan, or Wine Cooper Bay, at the bottom of which there are soundings and anchorage within a mile of the shore, with shelter from the easterly monsoon. From the bottom of this Bay, the direction of the coast is nearly W. ½ N., about 28 leagues to Java Head.

Anjol Point.

ANJOL, or WINE COOPER POINT, in lat. 7° 28′ S., lon. 106° 36′ E., is environed by rocks and breakers, having a small low sandy islet near it, on which several trees appear. In coming from the eastward this point is easily distinguished, the double land having a declivity towards it, and the point itself low, covered with trees, and terminates the coast in this part to the westward.

Claps' and Trower Islands.

CLAPS' ISLAND, called also Breakers' Island, bears W.N.W. about 20 leagues from Point Anjol, and is distant about 3½ leagues from the shore of Java, and about the same distance W. by S. from Trower Island, which lies about 2 leagues off shore; they are both low, covered with trees, having soundings near them, and anchorage inside of Claps' Island; to the northward of it and Trower Island, the land of Java is low; a little farther eastward it is high, with steep cliffs facing the sea; the land over Java Head is also high. Ships running for the land to the eastward of Java Head have often mistaken the high land first mentioned, for that over Java Head; and the space of low land between them, for the entrance of the Strait, as this is not discerned till well in with the coast. The high land over Java Head and that to the eastward are similar in appearance, the West end of each having a sharper declivity than their eastern extremities.

Appearance of the land about Java Head.

Java Head.

JAVA HEAD is in lat. 6° 48′ S., lon. 105° 11′ E. by mean of many chronometers and lunar observations taken in different ships, or 1° 41′ W. from Batavia City, measured by good chronometers: it is a bluff promontory, at the foot of the high land that forms the West end of Java, and from Claps' Island, it is about 7 leagues N.W. by W. Near the shore, to the southward of Java Head, there is a reef on which the sea breaks: and several rocks, near a mile off, may be perceived in coasting along from the southward. The variation near Java Head in 1790 was 1½° easterly.

From St. Paul towards Sunda Strait.

FROM THE ISLAND ST. PAUL, ships bound to Sunda Strait or Bencoolen may run several degrees to the eastward of its meridian before they edge away to get into the S. E. trade; they may afterwards keep away gradually to the north-eastward,

and cross the tropic of Capricorn in about lon. 102° E.—From March to September, they should get on the meridian of Java Head, several degrees from it, and steer North; the S. E. trade sometimes prevailing easterly in March, April, and May, with a current setting to the westward along the South coast of Java, during the easterly monsoon from March to September, renders it indispensable to keep to the eastward, and not fall to leeward of Java Head if bound into Sunda Strait in this season; ships should, therefore, endeavour to make Claps' Island, or Java Head itself, if certain of the longitude by observation, or by good chronometers.

Towards Sunda Strait in the easterly monsoon.

In May, June, and part of July, those bound to Bencoolen need not make Java Head, but they will probably make the quickest passage by steering direct for Engano, and from thence for Bencoolen, as the winds admit; because, in these months the winds often veer to N.W. with south-easterly currents, which enables the small coasting vessels to come from the northward to Bencoolen.

Westerly monsoon.

From September to March, N.W. and westerly winds often prevail between the northern limit of the S. E. trade and the equator, which is called the westerly or N.W. monsoon. In December and January, the westerly and N.W. winds are generally strong, extending from lat. 1° or 2° N. to lat. 12° or 14° S. These winds force a lee current before them to the eastward, which runs strong along the South coast of Java; the weather being then mostly dark and cloudy, with much rain. Several ships, in this season, having fallen in with the land to the eastward of Java Head, found it impossible to beat round against the westerly winds and strong currents setting to the eastward; they were, therefore, obliged to steer southward, re-entering the S.E. trade, where they made westing sufficient to pass to the westward of Java Head.

Passage during this monsoon.

In the season when westerly winds prevail, a ship bound to Sunda Strait ought *not* to proceed to the Northward on the meridian of Java Head, but should steer direct for the S.W. end of Sumatra, or the Island Engano, taking care to pass Java Head well to the westward, as the winds are often variable between West and N. N.W. near Engano and the entrance of Sunda Strait. When nearly on the parallel of Java Head, and 1° or 2° to the westward of it, a direct course may be steered for the strait, with an allowance for a probable current setting to the southward. These instructions may be followed from September to March, and ought certainly to be adopted in November, December, January, and part of February, when the westerly monsoon usually predominates.

Passage to Bencoolen.

In this season, a ship bound to Bencoolen should steer to the northward after losing the S. E. trade, keeping nearly on the meridian of Achen Head till she is well to the northward of the Cocos Island, or approaching the latitude of Java Head; she will then probably meet with north-westerly winds, with which a course may be followed to fall in with Trieste (Reefs) Island; or she may pass this island to the northward, between it and the Island Larg, if the wind prevail from northward; but should it incline from S.W. or southward as she approaches the former island, a direct course to the southward of it may be pursued for Bencoolen.

Instances of great delay.

One of the ships from London, bound to Bengal for rice, fell in with the island Engano in January, 1796. From hence, with north-westerly winds and a current setting to the S. E., she was carried to the southward of Java Head, and obliged to stand to the southward with the westerly winds, till in lat. 10° S. they became variable, which enabled her to make westing. This mistake occasioned the loss of several men by scurvy, as they were short of provisions, &c., and no supply obtained, till, after this protracted passage, she reached Bengal.

Another instance may be adduced, to shew the care requisite in running for the

Strait, and not to make the land to the eastward of Java Head in the N.W. monsoon.

Captain G. Richardson, of the Pigot, fell in with the land 5° to the eastward of Java Head, in December, 1771; this proceeded from the instructions advising the land to be made to the eastward of the Head, without noticing the seasons. He was obliged to stand to the southward into the S.E. trade, finding it impossible to get to the westward otherwise, the westerly winds being constant, with a current setting to the eastward along the South coast of Java. Having made sufficient westing in the trade to weather Java Head, he entered Sunda Strait, six weeks after falling in with the South coast of Java.

The Anna, bound to Bencoolen, made Java Head bearing N.N.W. ½ W. on the 5th December, 1703; having strong westerly winds and lee currents, she could not beat round it, and was forced to bear away on the 9th, in search of water and refreshments, in some of the bays on the South coast of Java; and she got all these with facility in Maurice Bay, as may be seen in the description of the South coast of Java.

Passage from Achen to Timor against the easterly monsoon.

H.M.S. Satellite, bound to Raffles Bay, North coast of Australia, left Achen Head June 29th, 1828, and made the South coast of Java in lat. 7° 55′ S., lon. 108° 52′ E. July 14th; had strong westerly currents to the southward of lat. 9° S., which were not experienced in working to the eastward near the coast of Java, nor was much experienced along the coast of Sumbawa: but after leaving the latter, and making the western part of Sandalwood Island, August 5th, in lat. 9° 51′ S., lon. 119° 31′ E., the current set daily from 25 to 30 miles to the westward in working along the South coast of Sandalwood Island, and from hence it continued nearly the same till she reached Rotti, August 11th; she passed from hence along the North coast of Semao, and touched at Copang for refreshments, where she remained six days, then sailed, and in lon. 125° E. crossed over the centre of Sahul Bank, as marked in Capt. Flinders' chart, but got no soundings with 70 to 130 fathoms line. In lat. 11° 33′ S., lon. 125° 12′ E., had a cast of 35 fathoms white sand and coral, and then no ground 120 fathoms: steered then S.S.E. 10 miles, and had 80 fathoms white sand, the depth gradually decreasing afterwards in approaching the Australian coast, agreeing exactly with Capt. King's chart. September 2d, at 7 A.M. tacked in 12 fathoms mud, a small island off the West point of Raffles Bay, bearing S.E. by E. 4 miles, Cape Croker, E.S.E. At 8½ A.M., tacked and led into the anchorage off Fort Wellington, anchored in 4½ fathoms, the Flagstaff of the Fort E. by S. ½ S., Round Island, S. ½ E. Here she remained two days, but could not obtain any water without distressing the settlement, there being only one well.

# THE OUTER PASSAGE TO PLACES ON EITHER SIDE THE BAY OF BENGAL.

## PREVAILING WINDS.—PASSAGE TO BENGAL.—PASSAGE TO MADRAS.

### PREVAILING WINDS.

Different routes towards India.

NAVIGATORS have the choice of proceeding by the Mosambique channel, or any of the routes East of Madagascar, when the S.W. monsoon prevails to the northward of the equator, which is from March to October. The outer passage to the eastward of the Chagos Archipelago may also be adopted in the same season, or at any time of the year, but ought certainly to be followed by all ships from Europe, or the Cape of Good Hope, which cross the equator from September to April, when north-easterly winds mostly prevail in North latitude.

Winds in the Indian Seas. S.E. Trade.

Between Madagascar and Australia, the trade wind generally prevails from S.E. in lat. 26° to 12° S. In February, March, April, and May, the southern limit of this trade is frequently extended to lat. 23° or 30° S.; and in these months, the wind is often fixed at East or E.N.E., continuing from these directions many days together; this happens more particularly in the ocean, for near the West coast of Australia the trade wind blows from southward and S.W.; and eastward of Madagascar, near the Islands Mauritius and Bourbon, it is often obstructed by sudden changes.

Easterly monsoon, in South latitude.

From the equator to lat. 12° S., the winds prevail from East and E.S.E. during six months; this is called the *easterly monsoon,* and continues from April to November. From October to April, the westerly winds prevail within the same limits, blowing often at N.W. and N.N.W., with cloudy weather and rain; this is called the *westerly monsoon,* and brings the rainy season; the easterly monsoon being the dry season to the southward of the equator.

Westerly monsoon.

The westerly winds are strongest in December and January, but never so constant as the easterly winds in the opposite monsoon, which frequently extend to the equator, in June, July, and August, from the meridian of Madagascar to lon. 90° E.; but in proportion as the distance from Sumatra is decreased, the northern limit of the easterly monsoon recedes to the southward, leaving a space of baffling variable winds and calms between it and the equator.

S. W. monsoon in North latitude.

When the S.E. or easterly monsoon is prevailing to the southward of the equator, on the North side of it the S.W. monsoon predominates, which is the rainy season in North latitude on most of the coasts of India. It commences in April at the North part of the Arabian Sea, Bay of Bengal, and China Sea; but seldom till May near the equator, which is its southern limit; from thence it blows home to all the coasts of India, Arabia, and China, continuing till October: this is a changeable month, liable to gales of wind on the Malabar Coast and in the Bay of Bengal.

In October, or early in November, when the N.W. or westerly monsoon begins to the southward of the equator, the N.E. monsoon commences in the Arabian Sea, Bay of Bengal, and China Sea, which continues till April. This is the fair weather monsoon in the Arabian Sea and in the Bay of Bengal, the winds being more moderate and settled than in the S.W. monsoon. The equator is the southern boundary of the N.E. monsoon, or general limit between it and the N.W. winds prevailing in South latitude; but there is often a considerable space between them, subject to light variable breezes and calms. N. E. monsoon.

It may be observed, that the N.E. monsoon should commence in October; but this is seldom the case in the southern part of Bengal Bay, for between Ceylon and the entrance of Malacca Strait, from the equator to lat. 8° or 10° N., westerly winds are frequently experienced in October and November, which blow strong and constant several days at a time: near the equator, these winds are mostly at N.W. and N.N.W. In a direct line from Ceylon to Achen Head, they are from W.S.W. to W.N.W.; and more northward into the Bay, from S.W. and S.S.W. Westerly winds in October and November, from Ceylon to Achen Head.

In October and November, these westerly winds prevail much about the Nicobars and the entrance of Malacca Strait, and from thence to Ceylon, so that it appears very detrimental for ships bound to that island, or to the Coromandel Coast, to fall in with Achen Head in these months; nor is this requisite during any period of the N.E. monsoon, for it must frequently lengthen the passage.

It is generally very tedious passing from the West coast of Sumatra or Sunda Strait to Ceylon, in October and November, on account of north-westerly and variable light winds.

## PASSAGE TO THE BAY OF BENGAL.

Ships bound to the BAY OF BENGAL, when they are entering the southern limit of the S.E. trade, or in about lat. 26° to 28° S., should be in about lon. 80° to 83° E. if they expect to pass the equator from March to October, whilst the S.W. monsoon prevails to the northward. In standing across the trade, it often happens that no easting can be made, the wind blowing more from East and E.N.E. than from S.E.; this has been experienced in different seasons of the year, but more particularly in March, April, and May. Between the meridians of Cape Comorin and Madagascar, in the western part of the Indian Ocean, the trade wind is most liable to hang far eastward; for near Java and the West coast of Australia it is found mostly at S.E. and southward. Of entering the S.E. trade, and proceeding to the Bay of Bengal.

As the S.E. trade is liable to blow from eastward, ships ought not to enter it far to the westward, with the view of running down much longitude whilst crossing, in case of getting near the Maldiva Islands with a scant trade.* When they get into lat. 1° or 2° N. from April to October, they may be certain of the westerly monsoon to carry them to any part of the bay. Ships bound to Ceylon or Madras in this season, should steer to the northward through the trade, keeping a little to the westward of the meridian of Point de Galle, if bound there. If bound to Trincomalee, they should

* This happened to the Contractor, as may be seen under the description of the southern part of the Maldiva Islands, and other ships have experienced the same.

The Severn, Capt. Adam Dixon, bound to Bombay, entered the S.E. trade in lat. 27° 40′ S., lon. 70° E., Dec. 1st, 1833; the trade wind prevailing from eastward with a westerly current, forced them to the West of Diego Garcia, which was passed at 6 miles distance, and afterwards they passed over some of the coral banks of the Chagos Archipelago, and near to a sandy isle and a reef, noticed in the description of these dangers.

make the land to the southward of it, from March to September; and to the southward of Madras from the 1st of February to September, when bound there.

Ships expecting to pass the equator between October and April, bound to the Bay of Bengal, may run to the northward in about lon. 85° E. through the trade, which will probably carry them in lat. 12° to 8° S.; variable winds, mostly from West to N.W., and squally weather, may be expected to follow, and continue from the northern limit of the trade to the equator.

Passage to Bengal after making Achen Head.

With these winds, ships bound to Malacca Strait should steer for Achen Head; but those proceeding for Bengal should keep at a reasonable distance from Hog Island and the N.W. end of Sumatra: for here they are subject to delay by baffling winds and north-westerly hard squalls, with a current setting into Malacca Strait, particularly in October and November, when N.W. and West winds prevail about the Nicobar Islands and Achen Head.

It is improper to pass to the eastward of the Nicobar and Andaman Islands, although it was *formerly* thought the only secure route to Bengal, during N.E. monsoon; but it is now well known, that light N.W. winds and southerly currents prevail along the Aracan Coast in this season, which makes the passage along it to the northward very tedious. Should any navigator, however, think the passage to the eastward of the islands requisite, during the strength of the N. E. monsoon, he ought to pass to the westward, by the Preparis, or Cocos Channel, and not approach the coast of Aracan.

After passing Achen Head at any discretional distance, from 1° to 2° or 3°, the West side of the Nicobar or Carnicobar Islands may be approached, if the wind admit, by ships proceeding to Bengal during any part of the N.E. monsoon. If the wind incline to keep to the westward, the islands need not be approached close; if at E.N.E. or N.E., ships ought to steer up the bay close on a wind, to the westward of the islands. In lat. 16° or 17° N. the wind often veers more to the northward; favourable tacks may then be made to the eastward at times, to keep from the West side of the bay; neither should the coast of Aracan be approached, but ships should work to the northward in the open sea, where there is smooth water and moderate breezes, which will enable them speedily to reach the Sea Reefs. It has frequently happened in the strength of the N.E. monsoon, that ships, by passing close along the West side of the Nicobar Islands, have reached the Sea Reefs at the entrance of Hooghly River, without making a tack. Navigators from Malacca Strait bound to Bengal, who have great experience, never proceed along the eastern shore, but adopt the channels between the Andamans, or to the southward of the Little Andaman, or even to the southward of the Nicobars, in time of war. They also proceed through the channels to the northward of the Great Andaman frequently, but always avoid the coast of Aracan.

Ships crossing the equator late in February, or in March, should keep well to the westward in passing up the bay, for the current then runs to the northward along the Coromandel Coast, and the winds are often between S.W. and S.E.; whereas, in the middle of the bay, they are variable and light from N.W. to N.E. in this month, with a drain of current at times setting to the southward.

## PASSAGE TO MADRAS.

Ships bound to MADRAS in October, or early in November, ought not to proceed too near to Achen Head in hopes of benefiting by the N.E. monsoon, for

they may be delayed by N.W. and westerly winds. In the middle or western part of the bay, in October, the winds will often be found variable from southward and westward; with which a ship may speedily get to the northward. During any period of the N.E. monsoon, there seems no occasion, if bound to Madras, to exceed lon. 86° or 87° E.; and this probably is farther than necessary, for ships which sail well.* These making the ports on the Coromandel Coast should fall in with the land to the northward of the place to which they are bound, *after September;* for the current begins to set along shore to the southward late in September, or early in October, and is strongest in November and December; but this, like the monsoons, commences in some seasons nearly a month sooner than in others. Passage to Madras in Oct. and Nov. during the N.E. monsoon.

At Point de Galle, and along the South side of Ceylon, and also in the Gulf of Manar, between that island and Cape Comorin, westerly winds prevail nearly eight months in the year. These winds commence in March, and continue till November, sometimes till the latter end of this month; ships, therefore, which pass the equator after the middle of March, bound to Ceylon by the outer passage, should steer North, nearly on the meridian of the place to which they are going, or rather keep a little to the westward of that meridian, as westerly winds may be expected to the southward and westward of the island, after the period mentioned, although not always constant. The same course of proceeding is advisable till November, and even in this month, strong westerly breezes may frequently be expected; but in part of October and November, the current runs strong to the westward between Ceylon and the equator, which might render it unpleasant, were a ship to have no westerly winds in the vicinity of the Maldiva Islands. Winds and currents near Ceylon.

In the Anna, we passed Point de Galle, November 24th, 1792, bound to China. On the 2d December, we were in lat. 3° N., and nearly on the meridian of Point de Galle, having experienced a constant current of 38 to 56 miles to the westward daily, by chronometers and lunar observations, from leaving Ceylon. During this time, we could gain no easting, the current being strong, and the winds light and variable from the northward. On the 2d December, the westerly current abated, and subsequently, a drain set to the eastward.

It is, however, improper for ships bound to Ceylon or the Malabar Coast to cross the equator far eastward in November, for, by doing so, their passage may be considerably delayed. The Woodford and Albion, bound to Bombay, in 1799, after crossing the equator, stood into lon. 88° E. in the early part of November, expecting to get the N.E. monsoon; but they had constant westerly winds, and made the S.E. part of Ceylon in the middle of that month: a continuance of these winds obliged them to beat round the island, which occasioned great delay. Had they crossed the equator in lon. 80° or 81° E., then steered direct for Point de Galle, or more westerly for Cape Comorin, after experiencing the wind constant from this quarter, their passage to Bombay would have been greatly accelerated. Crossing the equator.

The Belvedere, bound to Bombay, lost the S.E. trade, 19th October, 1793, in lat. 7° S., lon. 86° E., and had from hence N.W. and W.N.W. winds, to lat. 1° N.: these N.W. and westerly winds continued till the 30th, then in lat. 7½° N., lon. 85° E., at which time they veered to W.S.W. and S.W., enabling her to make the Friar's Hood on the 5th of November. She reached Point de Galle the 10th, where she was obliged

* But in January, February, and March, the equator should not be crossed *too far* to the westward, in case of the N.E. trade being scant, and leeward currents prevailing, which might carry a ship to the southward of Madras, or even near to the Island of Ceylon, which has been experienced, and thereby greatly prolonged the passage.

to enter the harbour, to renovate the health of her crew, and did not reach Bombay until the 5th of January, 1794. By losing the S.E. trade so soon, and crossing the equator so far to the eastward, her arrival at the port of destination was greatly prolonged.

The Travers, bound to Colombo, after crossing the equator with southerly and S.W. winds, 22d October, 1802, in lon. 82° 30′ E., had constant westerly winds; she worked against them, and arrived 2d November at Colombo; had she crossed the equator on the meridian of the West part of Ceylon, she probably would have reached her port with westerly winds without tacking.

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## FROM THE CAPE OF GOOD HOPE TOWARDS BOMBAY, CEYLON, AND BENGAL.

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Middle Passage.

MIDDLE PASSAGE is that to the eastward of the Madagascar Archipelago, having this and the Seychelle Islands to the westward, and the Chagos Archipelago to the eastward.

Boscawen Passage.

BOSCAWEN PASSAGE, named after Admiral Boscawen, who in 1748, with a fleet of 26 sail, proceeded from the island Mauritius to India by this passage, is more to the westward, or directly to the northward of the Islands Mauritius and Bourbon, towards the Island Galega, and to the westward of Cargados Garajos and Saya de Malha Bank; then from Galega, to the eastward of the Seychelle Islands. This route is shorter than the Middle Passage, and would be generally preferred, were the positions of all the low dangerous islands and banks adjoining to it correctly known; but as all of them are not, ships proceeding by this passage, if not certain of the longitude, should get a sight of Mauritius or Bourbon in passing, and afterwards of Galega, steering the course requisite to avoid the dangers on either side of the passage.

From the Cape to Bombay.

Ships destined for Bombay or the Malabar Coast, which do not pass the Cape before the 1st of September, ought not to proceed through the Mozambique Channel, but should adopt one of the passages on the East side of Madagascar, and the Middle Passage or Boscawen Passage, may be considered the most advantageous; the route by these being more to the eastward; consequently, a ship proceeding by them will be nearer to the coast to which she is destined at the approaching N.E. monsoon.

If a ship pass the Cape of Good Hope between the 1st* of September and 1st of October, bound for the Malabar Coast, or Bombay, and intending to adopt the Middle Passage, she should get in about lon. 67° or 68° E., when crossing the parallels of 26° or 27° S. in case the trade be far to the eastward, which frequently happens: this, however, is most common in March and April.

When she has got into the S.E. trade, a *true* North course is proper, keeping in about lon. 66° E., which will carry her well to the eastward of Cargados Garajos

* If they pass the Cape sooner, the route on the East side of Madagascar may be followed.

Shoals, and the Bank Saya de Malha: the variation will decrease quick, in running to the northward.

Winds and currents.

It is impossible to say how far a ship will carry the trade by this route in September or October, for, in these months, the winds may be found very different in one year to what they are in another. The currents are also liable to the same changes, between the equator and the northern limit of the trade in the same months.

Passages of ships.

Bound to Bombay by the southern passage from Malacca Strait, in the King George, we crossed the equator in lon. 65° E., September 5th, 1791. On the 8th, in lat. 3° N. the wind shifted from South to N. N. W., and N.W. and the current set north-eastward till the 11th, in lat. 5° N., lon. 66° E. From hence, the current set to the southward, 6 to 20 miles daily; and gentle breezes prevailed constantly between North and N.W. till we made Barsalore Peak and Pigeon Island, October 1st, having passed to the westward of the Laccadiva Islands. The wind sometimes veered to N.W. by W. and N. by E., but in general it was fixed between N.W. by N. and North. Next year, in the Anna, from China, we lost the S. E. trade, August 22nd, in lat. $1\frac{1}{2}$° S., lon. 65° E. From hence, had light variable winds, and a current to the southward of 16 to 30 miles daily, till we crossed the equator 29th, in lon. 63° E.; had then a southerly wind two days, and lost the adverse current; in lat. 4° N. we got a steady S.W. monsoon on the 31st, with which we reached Bombay, on the 9th of September. In the King George, the preceding season, we were only seven days later in passing the equator, nearly in the same longitude, and found that the S.W. monsoon had completely ceased.

In the Anna, the voyage following from China, proceeding, *improperly*, by the same route to the northward of the Chagos Archipelago, the S. E. trade failed September 7th, 1793, in lat. 4° S., lon. 75° E. The wind then veered to S.W. and W. S.W., and soon after to West and W. by S. We kept tacking with these winds till the 11th, to endeavour to get to the westward, but finding this impossible, bore away to the eastward of the Maldiva Islands, and made the land near Anjenga on the 18th September, having experienced steady winds at West, till we made the land. On the Malabar Coast, the current set constantly southward, and the winds were unsettled at N.W. and westward, which made it very tedious getting to the northward, and prevented us from reaching Bombay till the 21st October.

Crossing the equator.

When a ship has lost the trade, she should, in proceeding to the northward, endeavour to keep between lon. 65° and 68° E., in case of meeting with light winds and easterly currents near the equator, which might carry her near the Maldivas. When she has reached lat. 3° or 4° N., in October and November, northerly winds may be expected, which will probably keep more to the westward than to the eastward of the North point.

With the shifts of wind, advantage should be taken to tack as expedient; the sea being generally smooth, a ship, after getting into lat. 6° or 7° N., will soon get to the northward of the Laccadivas, if every advantage is taken of the favourable changes of wind; she may then stand to the north-eastward upon a wind, till the coast is seen. Or if bound to the southern part of the Malabar coast, she may pass through the Eight Degree or Nine Degree Channel, between the Maldiva and Laccadiva Islands; or through the One-and-a-half Degree Channel, if bound to Ceylon.

A ship bound to Ceylon, adopting this passage, in March, April, September, or October, may run to the eastward, keeping nearly on the equator or a little South of it, and pass the Maldivas through the One-and-a-half Degree Channel, the equatorial channel, or to the South of the whole of these isles.

From Mauritius to Bay of Bengal.

Ships which sail from Mauritius for Ceylon or the Bay of Bengal, from March to September, may steer to the northward on either side of Cargados Garajos, then to the eastward of the Seychelle Islands, and pass through the Equatorial Channel, or the One-and-a-half Degree Channel of the Maldivas: the latter channel is preferable to the Eight Degree or Nine Degree Channel, for ships coming from the Mozambique Channel towards Ceylon or Madras in the S.W. monsoon.

By Boscawen Passage.

Several ships bound from Mauritius to the Bay of Bengal in November, December, and January, have steered to the N. N. E. by Boscawen Passage till they got within 2° of the equator, then with the westerly winds, which are usually found near the equator, they steered eastward as far as requisite; this route, however, is sometimes tedious; the parallels of 1° to 2° or 3° South are considered proper for N.W. and westerly winds to run down the easting, by the equatorial route.

By equatorial route.

The following instance will shew that this equatorial route is sometimes precarious. The Sherburne left the Cape of Good Hope, October 20th, 1833, with Sir Charles Malcolm, the Superintendent of the Indian Navy, on board, who was to be landed at Point de Galle, in passing Ceylon, as the ship was bound to Bengal. On the 28th November, she crossed the equator in lon. 75° E., and had then light airs with a south-westerly current till the 12th December, which prevented her from reaching Ceylon; at this time, a N. E. wind was experienced when within 50 leagues of Point de Galle, and a westerly current setting towards the Maldivas, obliged her to re-cross the equator, but no westerly winds were found to the southward, as they blew from S. E. Afterwards, in proceeding up the Bay for Calcutta, the winds prevailed from the northward instead of the N. E. monsoon, which greatly protracted the passage to Bengal, and reduced them to a state of distress for want of water and provisions.*

From the Cape of Good Hope, the route by the Middle, or by Boscawen Passage, may be taken previously to the setting in of the S.W. monsoon, but the passage on the East side of Madagascar seems preferable at such times. I have, however, twice in March, proceeded by the Middle Passage to Bombay.

Passages by the ships Carron and Anna.

We left the Cape in the Carron, February 6th, 1798, got the trade March 6th, in lat. 26° S., lon. 67° E. In crossing it, the wind was seldom at S. E., or even at E. S. E., but in general fixed at E. by N., veering from E. N. E. to E. by S. On the 13th, lost the trade in lat. 10° S., lon. 64° E., having experienced a daily current to the westward. On the 20th, in lat. 4° S., lon. 62½° E., the current changed, and set four days to the eastward, at the rate of 62 and 64 miles daily. When in lat. 2° S., lon. 60° E., on the 23d, it abated.

From the 13th, at losing the trade, the winds were very variable till April 1st; in lat. 4° N., lon. 60½° E., we unexpectedly got a remnant of the N.E. monsoon, and a daily current to the westward, till in lat. 11½° N., lon. 56° E., on the 7th. Here we were involved by calms and faint airs seven days. On the 14th. in lat. 14° N., a steady breeze commenced at West, and veered gradually to the N.W. and N. N. W., with which we arrived, April 24th, at Bombay

In the Anna, we left the Cape, February 15th, 1800, and got the S. E. trade 8th of March, in lat. 28° S., lon. 69° E. The wind in crossing it at this time kept generally at E. S. E. and S. E. by E., but we lost it in lat. 13° S., lon. 69° E., on the 14th.

From this time we had the current changeable, mostly setting southward, with very light variable winds till we passed the equator, 29th, in lon. 68° E.; had then the wind

* Near the end of the second section following, it will be seen that the James Sibbald was more fortunate in her passage from Mauritius to Madras, in November, 1826.

from N.N.E., to N.N.W. in general, with which we tacked often till April 12th, then in lat. 7½° N., lon. 69° E. From hence, the wind kept mostly between N. by W. and N. W., with a southerly current in general. Stood to the N.N.E., only making a few short tacks to the westward occasionally, till we cleared the N.W. limit of the Laccadiva Islands on the 18th, without seeing any of them. After making the coast at Geriah, arrived the 29th at Bombay, having experienced no remnant of the N.E. monsoon, as we did on the former voyage in the Carron, April 1st, in lat. 4° N.; although at this time we reached the same latitude on the 2d of that month, or only one day later.

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## PASSAGE TO THE EASTWARD OF MADAGASCAR.

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IN THE MOZAMBIQUE CHANNEL, as there are light variable winds at times, particularly in August and September, many navigators prefer to pass to the eastward of Madagascar, where winds are more steady. Ships may proceed by this route from February to October; and although the distance by it is somewhat greater than the passage through the Mozambique Channel, this is rendered of no importance, by having better winds, particularly in August and September. *The passage East of Madagascar and the Inner passage compared.*

A ship intending to follow the route to the eastward of Madagascar, after passing the Cape, should get into about lon. 52° or 53° E. before entering the trade, or in crossing the parallel of 27° S.; for she may find it impossible to make any easting in the trade, till she get to lat. 18° or 19° S. Adjacent to the S.E. part of Madagascar, E.N.E. winds prevail, extending several degrees from the land. These are called *Fort Dauphin winds* by the French, as they mostly prevail along that part of the coast, and sometimes force a current to the southward of 40 and 50 miles daily, near the shore; consequently, a ship intending to touch at Fort Dauphin for refreshments ought to fall in with the land to the northward of the bay. If she fall to leeward, it will be difficult to beat up against the current, but it does not extend far from the land. *Touching at Fort Dauphin.*

The winds and currents do not, however, appear always to prevail; for the London on the 30th April, 1699, made the South part of Madagascar bearing W.S.W. about 6 leagues, then in soundings 46 fathoms at 6 A.M. She steered East 19 miles till noon, observed lat. 25° 26′ S., then in 50 fathoms, and had fresh gales from S.S.W. to S.S.E. From hence, she steered for Bourbon, passed in sight of that island on the West side, and anchored at Port Louis on the 17th of May.

In steering to the northward through the trade, a ship should continue in lon. 51° to 52° E. till she is in lat. 15° S., being then past Cape East, where the coast trends to N. by W. *true* bearing, she may edge in, and make the land at discretion. It should not be made to the southward, near the deep Bay of Antongil, as there might be difficulty in getting to the north-eastward, round Cape East. *Of making the coast.*

If a ship do not make the land to the northward of Cape East, she ought to see Cape Ambre, for a point of departure, which is a low point of land, terminating in a

ledge of rocks above water, with several conical hills near it to the southward. In passing along the N.E. part of Madagascar, the coast appears sterile, and the shore rocky; a little inland, the country is mountainous.

Passage across.

A course made from Cape Ambre, between *true* North and N. by E. is the safest track, till clear of the small islands which lie to the N. Eastward and N. Westward of it.

The variation in lat. 10° S., nearly on the meridian of Cape Ambre, was 13° W. in 1802, therefore, a course from it by compass N. N. E. is very proper till past the African Islands, in lat. 5° S.; she may from thence steer a direct course N.E. for Bombay. A ship should not make above $1\frac{1}{2}$° or at most 2° E. by chronometer from Cape Ambre, till past the African Islands.

Current.

It must be observed, that off the North end of Madagascar, the current generally runs strong to the westward all the year round. From Cape East to Cape Ambre, it sets along shore to the northward, and the wind on this part of the coast generally veers to the southward when the sun is in the northern hemisphere.

Abstract of the route of two ships by the eastern passage.

The Ocean and Addington went this passage early in the season; they left the Cape February 25th, 1803, and did not go to the eastward of lon. 51° 20′ E., in passing Madagascar. The trade prevailed mostly at E. by S. and E.S.E. On the 16th March they stood to the westward to make Cape Ambre, but did not see it. From lat. 13° 40′ S., lon. 50° 40′ E., they made a North course by compass 154 miles, then steered N. by E.; from lat. 5° S. to 10° N. the winds were very light and variable, which prevented their reaching Bombay till the 7th of May.

The Anna's route.

In the Anna, we passed Cape Agulhas the 27th of June, 1802; got the trade July 11th, in lat. 27° S., lon. 51° E. Between lat. 25° and 20° S., the wind was mostly at E. by N. and E.N.E., sometimes N.E. by E., which obliged us to make two short tacks: our lon. being $50\frac{1}{2}$° E., we were afraid of getting near the land with the Fort Dauphin winds, but experienced no westerly current. In lat. 19° S., the wind veered to E.S.E., next day to S.E.; on the 17th, made the coast in lat. 14° 20′ S., and steered along it to Cape Ambre; at 8 A.M., this Cape bearing S. by W. $\frac{3}{4}$ W. by compass, steered N.N.E. $\frac{1}{2}$ E. 84 miles, then N.N.E. till in lat. 5° S., then N.E. till we reached Bombay, July 31st. On the day we passed Cape Ambre, had 45 miles northerly current; it set strong in this direction along the shore South of the Cape, and also beyond it to the northward.

# FROM THE CAPE OF GOOD HOPE TO THE ISLANDS OF BOURBON, MAURITIUS, AND RODRIGUE, AND FROM THENCE TOWARDS INDIA.

## THE PASSAGE TO BOURBON, &c.—DESCRIPTION OF THE ISLANDS.—PASSAGE TO INDIA.

### PASSAGE TO BOURBON, &c.

IN SAILING FROM THE CAPE OF GOOD HOPE towards any of these islands, the easting must be made in a high southern latitude, as best corresponds with the season of the year, agreeably to the instructions already given for proceeding towards India. Directions.

In entering the trade, or passing the parallel of lat. 27° S., a ship should be nearly on the meridian of the island to which she is bound, that she may not be obliged to haul close to the wind, should it hang from the eastward. If bound to Rodrigue (called also Diego Rais), lat. 27° S. may be crossed in about lon. 63° E.; if to Mauritius, in about lon. 57½° E., or in 56° E. if bound to Bourbon.

When the sun has great North declination, it may not be absolutely requisite for ships which sail well, to reach the meridian of their port so far southward, the trade wind *then* blowing more from S.E. and E.S.E. in general, than from East and E.N.E. It must also be observed, that there is a kind of *northerly* monsoon in the vicinity of Mauritius and Bourbon, from November to April, during which period the winds are very variable, often from N.E. to N.W., particularly from the latter quarter. From October to May, gales of wind are liable to happen in these seas: at Bourbon, there are generally one or two each season, and in some years a hurricane. Although the latter have been known to happen in December, at Mauritius, also in January and February, they are more liable to be encountered in March or April, when they blow very severely, and are more frequent than the hurricanes in the West Indies. Winds. Gales and hurricanes.

### DESCRIPTION OF THE ISLANDS RODRIGUE, MAURITIUS, AND BOURBON.

RODRIGUE, the centre, in lat. 19° 41′ S., lon. 63° 29′ E.* by chronometers, extends East and West, about 15 miles, and is about 6 or 7 in breadth from North to South: it is high uneven land, which may be seen 12 or 14 leagues in clear weather. Reefs and shoals encompass it, extending 3 to 5 miles from the shore, except at the N.E. part of the island, where it is bold, having within half a mile of the shore 16 and 18 fathoms; from this depth, in standing to the northward, it increases to 25, 30, 40, and 45 fathoms, 3 miles from the shore, then no ground; farther westward, the Rodrigue.

* It was formerly placed about 3 leagues farther West. Captain Hart of H.M.S. Melville, made the East point in lon. 63° 36′ E., by mean of 4 chronometers measured to Port Louis.

Mathurin Bay. soundings are more gradual. The Road or Harbour is called Mathurin Bay, and near the middle of the island, and South from the Road, there is a remarkable peak, which answers as a guide. You may stand in shore to 16 or 18 fathoms, but the bottom in general is coral rocks, though in some spots, sand and mud. There is a small level spot of land between two hills, with some houses, where a resident and some soldiers were usually stationed. An extensive shoal, called the Middle Ground, fronts the harbour, on some parts of which there are 3, 2, and $1\frac{1}{2}$ fathoms, with gaps of 6, 7, or 8 fathoms, between the shoal patches. The harbour is in general good holding ground, the bottom being a mixture of sand and mud. The tide rises about 6 feet, high water at $1\frac{3}{4}$ hours on full and change of the moon, the flood runs to the eastward, and the ebb to the westward, about 2 miles per hour. Variation 10° W. in 1810. At this time, there were only three French families on the island, and about forty slaves.

Tides.

Entrance Channels. There are two channels for entering or leaving the harbour; the eastern one being only about 250 yards in breadth, renders it very intricate for large ships. The western or leeward channel is free from danger, being about a quarter of a mile in breadth, formed by a small shoal of $2\frac{3}{4}$ fathoms on the edge of the Middle Ground, and a rocky patch of $3\frac{1}{2}$ fathoms to the westward; this channel being far to leeward, should only be used by ships going out of the harbour. There is another channel over the Middle Ground, of the same breadth, which was used for bringing in ships previous to the survey of the harbour; but this was often attended with danger from violent gusts of wind from the valleys, rendering a ship liable to miss stays when near the reef, where she might be on the rocks before the anchor could bring her up. Ships, therefore, should always go in by the Eastern, and out by the Western Channel.

Directions. If a ship have occasion to touch here, she must go in by the Eastern Channel, and after having made the East or N.E. part of the island, may stand in within $1\frac{1}{2}$ miles of the reef, and coast along it at this distance until Booby Island is seen, which bring to bear W. $\frac{3}{4}$ S., and steer towards it with this bearing, keeping a good look-out for the Peak, which will bear about S.S.W. $\frac{1}{4}$ W. when first seen. Steer for Booby Island till the Peak bears S. by W. $\frac{3}{4}$ W., or about two ships' lengths open to the eastward of the White Rock,* then Diamond Island will be just touching Diamond Point, and you will be at the entrance of the channel with the Peak S. by W. $\frac{3}{4}$ W., Booby Island W. $\frac{3}{4}$ S., and Diamond Island touching, or a little on with Diamond Point:† steer in W. by S. $\frac{1}{2}$ S., until the Peak and White Rock are in one (observing not to open Diamond Island with the Point), then haul up S.W. $\frac{1}{4}$ W., or S.W., keeping a good look-out on the larboard bow for a $2\frac{1}{4}$ fathoms shoal, which is generally visible, and when Diamond Island is open with Diamond Point you are within the shoals, and may run down to the westward, and anchor in 12 or $12\frac{1}{2}$ fathoms sand and mud, with the Peak bearing from S. $\frac{1}{4}$ W. to S. $\frac{1}{4}$ E., and Diamond Island between two knobs or Hummocks,‡ near the point, which is the most convenient berth for watering.

The wind is too scant to sail out by the Eastern Channel; a ship leaving the anchorage, therefore, should use the Western Channel, and as soon as the anchor is weighed for that purpose, get her head round to W.N.W. and run down till the Peak bears S. by E. nearly, then haul up N. by W. or N. $\frac{1}{2}$ W. (observing how the tide sets you, so as to keep the Peak bearing S. 10° E.), and when the N.E. point of the island is open with the East point of the Bay, you are clear of all the shoals, and will have 16 or 17 fathoms water. A rocky Patch, of $3\frac{1}{2}$ fathoms, has been discovered

* A rock close to the shore, whitened to make it conspicuous.
† See View A, in Lieutenant Grubb's Plan of the Bay.
‡ See View B, in the Plan.

nearly in the middle of the Western Channel, and in 1810 there was a blue buoy placed on it. The Peak, just open to the West of the large house, leads a ship between the Rocky Patch and the western extremity of the Middle Ground.

In sailing into, or out of, this harbour, a good look-out from the fore or fore-topsail yard is advisable, for the shoal coral reefs may often be easily seen when the water is clear: a boat a-head is also a necessary precaution for those who are unacquainted.

The soundings decrease regularly from 30 fathoms, 2 or 3 miles off, to 8 or 9 fathoms, within a cable's length of the reef.

These directions for sailing into and out of Mathurin Bay were given by Lieutenant Grubb, of the Bombay Marine, and accompanied his excellent plan of that bay, which has been published, and ought to be obtained by those navigators who may have occasion to stop at Rodrigue, for it contains views and land-marks as guides. Lieut. Grubb's Plan of Mathurin Bay.

The only inducement a ship can have to touch at this place, is the want of fresh water, there being plenty of this necessary article in the harbour, and also wood for fuel. Wood and water. Fish may be caught in abundance, but some of them are of a poisonous* quality; which the people in Commodore Tiddeman's squadron found was confined to those caught in deep water, with hook and line; whereas those got by the net or seine, in shore, were good and wholesome. Fish.

At Rodrigue the trade wind blows more constantly than at Mauritius or Bourbon, prevailing between East and S.E. greatest part of the year; the weather is sometimes cloudy, with showers of rain, when the wind is strong; but more frequently hazy and dry, with a moderate trade. Winds and currents. The stormy months here are January, February, and March, when a hurricane is liable to happen, and also in November and December. The current throughout the S.E. trade generally sets with the wind to the westward, from 5 to 15 miles daily; but at times it runs eastward, in opposition to the wind.

Hurricanes are liable to happen here, from the beginning of November till the end of March, and in some years there are two, but generally only one, and sometimes none: they blow with great violence, commencing from southward, and veering round to East, N.E. and N.W., where they gradually decrease after continuing about 36 hours. Hurricanes and Tempests. When at anchor in the harbour, the approach of these hurricanes may be known, without the assistance of a barometer, by the darkness of the atmosphere, the rising of the water above its usual level, and the hollow roaring of the breakers on the reef and shoals; and they generally give about 24 hours' warning. The hurricanes sometimes extend far to the eastward in the S.E. trade, or nearly to the coast of Australia. Instances of Storms. November 21st, 1808, the homeward-bound fleet from Madras, in lat. $9\frac{1}{2}°$ S., lon. 90° E., had a violent storm from westward, round to eastward after moderating, then blowing with redoubled violence, and veering to S., S.W. and N.W., with a very cross high sea, till the weather moderated on the 23d. In this tempest, the Company's ships, Lord Nelson, Glory, and Experiment, foundered with

* Those fish, which are noxious, probably feed on the vegetating poisonous coral on the edges of the reefs. Abbe Rochon states, that several kinds of poisonous fish are found on the coast of Madagascar, which are discovered by placing a piece of silver under their tongue; for it loses colour, and turns black when the fish are noxious. He also mentions, that the squadron of Admiral Boscawen suffered a considerable loss at Rodrigue, for having neglected this precaution. At several places within the tropics, a poisonous quality is supposed to pervade some kinds of fish at particular seasons. It is generally thought by sailors, that a piece of silver placed along with such fish, when boiled, will turn black, but this may be only a vulgar opinion. The Baracouta, at some of the West India Islands, is considered dangerous to eat at a particular season, although, at other times, it is generally considered a wholesome and delicate fish; and is thought so at all times in the Gulf of Persia and on the Malabar coast.

their crews, and the Diana was nearly sharing the same fate. The Ann, one of the ships in this fleet, suffered very little during the storm.

March 14th, 1809, the homeward-bound fleet from Madras and Ceylon, in lat. 23° S., lon. 62° 40′ E., had a violent gale, commencing at S.E. increasing on the 15th from the eastward with constant rain, then moderated without veering round the compass. In this gale the Bengal, Calcutta, Lady Jane Dundas, and Duchess of Gordon, four of the Company's regular well-built ships, foundered with all their crews; and it is remarkable, that the Earl St. Vincent, and some other ships of this fleet, suffered no damage in the gale, nor even appeared to have considered it as very tempestuous, although their distance from the ships that perished could not be great, so partial are these tempests in their local range.

February 10th, 1828, in lat. 30° S., lon. 46° E., the Company's ship, Buckinghamshire, encountered a hurricane from the eastward, which afterwards changed to N.W., and blew equally strong. The ship broached to, after the foresail had been blown away, the quarter cutter and hammock boards were washed away. The barometer fell previously, and gave sufficient warning, it being at 28.90 during the height of the tempest, the sympiesometer then at 28°. Both commenced rising two hours before the wind abated.

January 21st, 1825, in lat. 23° S., lon. 74° E., the Company's ship Dunira lost all her masts and bowsprit, and nearly foundered in a violent hurricane.

January 3d, 1827, in lat. 13½° S., lon. 100° E., the Macqueen had a violent gale, in which she lost sails, and sustained other damage.

March 4th, 1830, in lat. 17½° S., lon. 90° E., the Bridgewater, from China, was dismasted, and was nearly lost in a dreadful hurricane; she was obliged to proceed to Calcutta in a leaky state, where she was condemned as not worthy of repair.

January 11th, 1831, in lat. 17½° S., lon. 86½° E., the Reliance was laid over on her beam ends by a hurricane, which blew all her sails in pieces, although furled and well secured at the time it came on. These tempests usually commence with the wind from North or North-eastward, shifting to South, then to S.W. or westward as the force of the wind abates. Prior to their approach the mercury falls in the barometer, and sometimes during their progress, a full inch below its usual height, and begins to rise again before the fury of these tempests is much abated.

Mauritius.

MAURITIUS, or ISLE OF FRANCE, about 100 leagues to the West of Rodrigue, is mountainous, and may be discerned 16 or 18 leagues off in clear weather, but it seldom can be seen at a great distance, the summits of the mountains and other elevated parts of the island being frequently enveloped in clouds. This island extends in a N.E. and S.W. direction, the S.W. point being in lat. 20° 27′ S., lon. 57° 16′ E., and the N.E. point in lat. 19° 53′ S., lon. 57° 35′ E.

Directions.

Great care is requisite when running in with the eastern part of the island in the night, as dangerous reefs project from several places nearly a league into the sea. When a ship approaches the N.E. part, in lat. 20° S., four small islands will be seen at different distances from the N.E. part of the main-land. The channel generally used, in sailing to the N.W. Port, is between the inner island, called the Gunner's Quoin, and the others which lie farther from the shore. Round Island is the most remarkable, and lies about 4 leagues off, in lat. 19° 50½′ S., lon. 57° 45′ E., being about 1 mile in length; it is high, appearing like a haycock, and can be seen at 10 or 12 leagues distance. A ship coming from the eastward, in the latitude of the island, will discover it sooner than the main island, especially in cloudy weather, or when the

horizon is hazy. In approaching Round Island, a large barren islet or rock is perceived; this is called Serpent Island, and lies N.E. ½ N., about a mile from the former. If a ship pass outside of all the islands, with the wind far to the southward, she will have to work in afterwards; it is, therefore, proper to pass to the southward of Round Island, keeping more than half a league from it, to give a berth to the reef projecting out to the westward.

About 3 or 4 miles N.E. by N. from the Gunner's Quoin (or Coin de Mire), and about 7 miles West from Round Island, Long, or Flat, Island is situated, the greatest part of which is very low land; it is cut in two by a small arm of the sea, and close on the North side there is a large rock, resembling a tower, called Le Colombier, or the Pigeon House, which seems separated from Flat Island, though joined to it by a ridge of rocks even with the water's edge.* The only part of Flat Island that is high, is the West end.

When a ship has passed Round Island on the South side, keeping it at least 2 miles distant in passing, she should steer for the Gunner's Quoin, bearing from the former about W. by S. ½ S., distant 10 miles, and give a berth to the West end of Flat Island in sailing along, on account of a reef of rocks extending about a cannon-shot from the S.W. point of a sandy cove, directly opposite to the Gunner's Quoin; as this reef is very dangerous, she ought to keep at least, in mid-channel, or nearest to the Gunner's Quoin, taking care not to approach very close to the latter, there being several rocks above and under the water, extending from the North side of it, about a musket-shot distant.

Having passed the westernmost of these rocks, the Gunner's Quoin will be approached, from which the island takes its name; it is situated on the West part of the island, which is high and steep close to the sea. From the highest part of the Quoin, Canonniers' Point bears S.W. by W., about 5 miles; but this point must not be approached near, as a reef of breakers projects from it about the distance of a cannon-shot. Among these islands the currents set strong for about an hour at a time, often at the rate of 3 miles an hour. The flood sets N.W. and sometimes westward; the ebb to the S.E. and eastward. They ought to be attended to, with care, that a ship may be navigated a little more to one side or to the other as circumstances require. Currents or Tides.

Between the Gunner's Quoin and the main, close under the Quoin, there is tolerable anchorage in 10 to 20 fathoms, and here the fleet of transports anchored on the 29th November, 1810, and landed the troops prior to the capture of the Island of Mauritius.

If a ship, in passing through the channel among the islands, experience a calm, she ought to anchor with a stream or kedge, in 15 or 20 fathoms gravel or coral, which is the common ground here; this will prevent her from driving by currents on the reef joining Flat Island, or being carried between it and Round Island, where are several shoals, particularly a ledge extending nearly 3 miles to the north-westward from Round Island. This ledge, which has no breakers on it but when the sea runs high, renders this channel narrow and dangerous; a ship may, notwithstanding, pass through it without accident, but if she fall to leeward of Round Island, it is safest to pass outside of Flat Island also, keeping about 1½ miles from it, then steer for the West end of the Gunner's Quoin and Canonniers' Point. Anchorage in the channel.

Having cleared this Point, she should run along shore to the Point of Sea Arm, which is about 3 miles farther south-westward, and continue the course, keeping near a mile from the reefs that extend along the coast, taking care to avoid those at the To sail towards Port Louis.

* Captain Owen, R.N., says there is a narrow channel, with 11 and 12 fathoms water in the middle of it, between Colombier and Flat Island.

entrance of the Baie des Tortues (Turtle Bay), as well as those of the Baie du Tombeau (Monument Bay), which projects farthest out; to avoid these, she ought to keep in 13 or 14 fathoms at least in the day time, and in 20 fathoms during the night.

From the Reef du Tombeau, the course is about S.S.W. till the starboard point of Great River, and the mountains of the guard-house, with a small hummock, are brought to bear all in one. When you have got into this bearing, steer S.W. for two buoys at the entrance of the harbour, close to the reefs end of Cooper's Island, (Ile aux Tonneliers) which buoys are distinguished by two small flags. This course should be continued till you open the most advanced point of Cooper's Island, near the small hill in the hollow of the cape; then anchor in 14 or 15 fathoms, about a cable's length from the two flags mentioned.

If the wind happen to be at North or N.W., which is sometimes the case, it will be needless to anchor outside, because you may then easily enter the harbour, if acquainted, the channel being marked out by buoys with small flags upon them; you must then steer S.E. and S.E. by S. for two heads of mountains, which are called the Peter* Bottes keeping them a little to starboard, till quite within the first point of Cooper's Island.

Of making the land at night.

If you do not make Round Island till the evening, and are unable to pass the Gunner's Quoin before night, it would be extremely dangerous to lie exposed between the islands, when the darkness does not permit you to distinguish objects: it is much safer, therefore, to make small trips in the offing, or in sight of Round Island, with this caution, however, not to stand off farther than 2 leagues from it, and when you tack to keep your broadside towards Mauritius, for fear of the reefs; for in this part they extend far out, by which you might get on the shelves before the land is seen. You ought by no means to lie in this track, because of the tides.

After passing Round Island, if you discern Flat Island and the Gunner's Quoin, and can keep sight of them, which may be done in a bright moonlight night, with fine weather, you may steer on your course and sail betwixt them; it will be sufficient, if you guard against the ledges of Flat Island and the Gunner's Quoin. Having passed the latter, and being about $1\frac{1}{2}$ leagues to the westward of it, steer W.S.W. to range along the reef of Canonniers' Point, on which a light is usually shewn when any vessels are in sight. When that light bears S.E. about 3 miles, you will have doubled the reef, and may then coast along, taking care not to approach the shore nearer than 15 fathoms.

It is, however, difficult to distinguish the entrance of the harbour in the night time, and as you may be easily deceived by the different fires on the mountains, it is much safer, after having passed Canonnier's Point to anchor in 18 or 20 fathoms, and wait for daylight; above all, when there is little wind you must never venture to come near Canonnier's Point, whether in the day or night, because of eddy tides which run there with great velocity.

These directions for sailing into Mauritius are chiefly those of M. d'Apres de Mannevillette: English navigators have given the following instructions for sailing to the ports of this island:—

Further directions for proceeding to Port Louis.

In approaching the N.E. end of Mauritius, when Round Island is seen, steer to pass it on the South side at 2 or 3 miles distance; Gunner's Quoin will then be seen to the

* Two knobs like chimneys or upright stones, one of them on a mountain inland, the other on a hill nearer the harbour; these should be kept in a line with each other till inside Fort Tonneliers.

The highest mountains on this island are about 2,600 feet above the level of the sea, and this is one of them.

westward; steer direct for it, until it is approached within a mile, then edge away to the north-westward, between it and Flat Island, which has a white rock, called the Pigeon House, on its North side. In passing through, keep nearest the Quoin, and having passed it, at 1 or $1\frac{1}{2}$ miles distance, on the North side, steer S.W. for Canonniers' Point, if the wind is from the land; but should there be the appearance of a sea breeze, steer more westerly, on account of the swell it commonly brings in with it setting towards the shore. In steering along, keep about 3 quarters of a mile or 1 mile from the reefs projecting from the points; you will pass several batteries before reaching the Pavilions, which are two small flags* close to the extremity of the N.E. shoal, at the entrance of Port Louis Harbour, about 8 leagues distant from Round Island. In the day, the discoloured water on the reefs will be seen at a considerable distance, if a good look-out is kept from the fore-yard, should a ship by chance approach any of them too close. The pilots generally come out to the distance of 2 or 4 miles from the harbour, to carry ships in, particularly if the necessary signal is made. As the wind generally blows directly out of the harbour, ships are obliged to warp in, by coir hawsers laid along one of the lines of buoys, to each of which the hawser is stopped by a rope-yarn, to keep the ship in the fair channel between the two lines of buoys; and a diver attends, to cut the rope-yarn as each buoy is approached. Mid-channel between the lines of buoys is the best track to have the deepest water, and to keep clear of the different wrecks sunk near the edges of the channel.

Winds and currents.

From October to February, when the winds are inclined to vary, and sometimes blow from North and N.W., the current is then liable to run to the eastward along the North side of the island; at such times, ships may approach Port Louis with facility, by coming round the West side of the island. This is the best season for ships crossing over from Madagascar to Mauritius and Bourbon.

Port Louis.

Port Louis is in lat. 20° 9′ 45″ S., lon. 57° 28′ E., by the observations of Abbé de la Caille, and d'Apres, corresponding with each other within a mile of longitude. In 1788-9, the mean of 70 distances of ⊙ ☾, made it in lon. 57° 29′ E. from Greenwich, the lat. 20° 9′ 33″ S., and the variation in the Road at the same time 16° 20′ W. Captain Flinders made it in 57° 29′ 57″ E. by lunar observations, taken while he was detained a prisoner of war. Capt. Owen, during his survey of the Madagascar Archipelago, made Cooper's Island abreast of the line-of-battle ships' moorings, in lon. 57° $31\frac{3}{4}$′ E., or 39° $5\frac{3}{4}$′ East of Devil's Peak, Table Bay, Cape of Good Hope, by excellent chronometers.† Col. Lloyd, the late Surveyor-General, gives the longitude of the Observatory by the mean of 4 eclipses, 20 occultations and 62 lunar distances, 57° 29′ 30″ E.

Time Signal.

A time signal for rating ships' chronometers has been established at Port Louis since April, 1833. On Tuesdays and Fridays a circular black disc, painted on the Observatory wall, and distinctly visible from the harbour, is, by means of a shutter, suddenly obscured at the instant of One o'clock Mauritius Mean Time. A white and blue flag is hoisted on the Observatory Tower at noon, and lowered about five minutes before the obscuration of the disc; and if any error has been committed in making the signal the flag is again hoisted.

Port Bourbon.

Port Bourbon, called also Grand Port, is the S.E. Port of the Island of Mauritius, situated in lat. 20° 22′ S., lon. 57° 41′ E. It is little frequented, being on the windward side of the island; the trade wind blowing generally into it, the navigation out is thereby rendered very difficult; more so, as the two channels are narrow, and formed between reefs. At full and change of moon, there are breezes at times from the land,

* In Lieutenant Evans's excellent survey of this Port, there is only one flag marked on the outermost buoy, which is placed at the entrance of the channel, beyond all the other buoys.

† Lieutenant Raper adopts 57° 31′ 45″ E. for the longitude of Cooper's Island.

when a ship may be enabled to get out of this harbour. The eastern channel is of great length, winding in various directions, narrow and intricate. The western channel, although narrow and winding, is more safe; in entering it you keep Passe Island, which is on the edge of the eastern bank, close-a-board, and when round it you haul to the eastward, to avoid the point of the western reef, and may then anchor in the basin, in 25 or 30 fathoms. If you are to proceed for the harbour, the channel may be perceived by the colour of the water, as the dangers plainly appear. This harbour is secured from all weather by a reef, great part of this being dry at low water.

Directions.

Bourbon Island.

BOURBON, or MASCARENHAS, is of round form, about 14 leagues from N.W. to S.E., which is its greatest length. There is a volcano near the S.E. part and the high peaked mountain near the centre of the island is in about lat. 21° 9′ S. Although this island is larger than Mauritius, it is only a great mountain, in a manner cloven through the whole height in three different places; the summit is covered with wood, and its declivity, which extends down to the sea, is cleared and cultivated in two-thirds of its circuit; the remainder is covered with lava of the volcano, which generally burns gently and without noise; but it is sometimes violent in the rainy season. In November, 1828, it was in a state of activity, and the summit of the mountain was visible above the horizon at 97 miles distance.

St. Dennis.

St. Dennis, at the North part of the island, is the principal town, situated in lat. 20° 52′ S., lon. 55° 27′ E. Capt. Samuel Ashmore,* in November, 1828, made it in lat. 20° 52½′ S., lon. 55° 23′ 51″ E. by two chronometers, agreeing in a five days' run from Port Louis, allowing the latter to be in lon. 57° 28′ E. The volcano he made in lat. 21° 16½′ S., lon. 55° 39′ 12″ E., and the South point of the island in lon. 55° 23′ E. At St. Dennis, he anchored in the brig Guide, in 18 fathoms fine sand, with the easternmost extreme in sight, St. Mary's S. 64° E. distant 7 or 8 miles, North point of the island S. 75° W. about 1¼ miles, the westernmost extreme visible S. 81° W. 3 or 4 miles, and the Stone Wharf S. 2° E. about ¾ of a mile, which must have been on the outer edge of the bank. There were about 20 sail of French vessels inside of the Guide at this time, at anchor in from 14 to 8 fathoms water. Variation in the road 13° 36′ W. At St. Mary the Guide passed close to 7 vessels at anchor; and at Bois Rouge, which lies further to the eastward of St. Dennis, 6 sail were anchored; and Capt. Ashmore was informed, that at two other places to the southward of Bois Rouge, vessels occasionally anchor to receive cargo.

St. Paul.

There is also anchorage in St. Paul Bay, at the N.W. part of the island, in the district of St. Paul, where the sea is tolerably smooth, but the landing is rather difficult. The island has no safe port where ships can be sheltered from bad weather, on which account vessels seldom remain long at anchor, especially during the rainy season.

Stormy season.

Hurricanes are liable to happen from November to the latter end of April, and are more particularly dreaded about the full and change of moon. In this season it is thought unsafe to anchor, except during four or five days after the new or full moon, and vessels do not remain more than five or six days, or even less, for fear of storms at the phases. The hurricanes at Bourbon are thought to be more violent than at Mau-

* He was also at Bourbon in April, 1828, in the course of trading from Sidney, New South Wales, to these islands. On the wharf at St. Dennis, there is erected a wall, from which the heads of three pair of sheers are supported by tackling, and from them are an equal number of stages suspended: under the outer ends of these, the cargo-boats are placed to receive or deliver cargo. A hanging rope ladder is also attached for persons to ascend or descend. A blue flag is shown at the flagstaff when boats ought not to approach the shore, and this, with the addition of a gun fired, is for the vessels to proceed to sea, which frequently happens; although, when Captain Ashmore was there in November, 1828, a hurricane had not been experienced during the preceding four years.

ritius: notwithstanding which, ships touch at the island in the stormy season, to load coffee, and take in provisions.

## PASSAGE TO INDIA.

THE PASSAGE, from the islands Mauritius and Bourbon towards India, may be followed at all seasons. When the wind is fair, or inclined to keep at S.E., ships leaving Port Louis will often be able to steer direct to the E.N. Eastward, and pass to the East of Cargados Garajos without tacking, also to the East of Diego Garcia, if bound to the Bay of Bengal; or they may pass on the West side of Cargados Garajos without losing time, if unable to weather those isles and shoals, which require great care when crossing their parallel. When the N.E. monsoon prevails in North latitude, it is prudent to get to the eastward as speedily as possible. Passage from Mauritius towards India.

The Alexander left Port Louis, 30th December, 1810, bound to Madras, had variable winds, chiefly between N.W. and E.N.E., with which she passed to the southward of Diego Garcia, and had light winds and calms, by keeping so far South of the equator, which she did not cross till in lon. 92° E. Light winds continuing, she touched at Achen for refreshments and water, having troops on board, where she arrived 26th February, 1811. Sailed from thence, the 4th March, and arrived on the 11th, at Madras. Passage of the Alexander.

The Sir Stephen Lushington left Port Louis 22nd December, 1810, bound to Madras, and with easterly winds she sterred to the northward, saw the islands Galega, Coetivy, and passed over the Fortune Bank in 10 and 12 fathoms; she passed to the westward of the Chagos Islands, then steered to the eastward, mostly in lat. 4½° to 5° South, with light variable winds, till she got within 2° of the equator, in lon. 85° E., and had then strong N.W. and W.N.W. winds, with which she arrived the 6th February at Madras. Passage of the Sir Stephen Lushington.

This ship kept too far South of the equator in running down her easting; ships following this route from September to March, should keep very little to the southward of the equator, for by keeping within 1° or 2° of it, they will be more likely to have north-westerly winds, to run down their easting, than by continuing in a higher parallel of South latitude.

The James Sibbald left Port Louis October 25th, 1826, bound to Madras, steered mostly between N. ½ E. and N.N.E. with the wind from East to S.E. till November 5th, in lat. 4° S., lon. 60° E., when the wind changed to W.S.W. and S.S.W. with cloudy weather and frequent showers of rain. Steered from hence to the N.E. till in lat. 1° S., and kept on this parallel till the 13th, in lat. 0° 13′ N., lon. 82° E., when the wind veered to N.W. and N.N.W. still blowing strong, with cloudy weather; continued to steer to the N.E. till in lat. 2° N., the winds then became light, mostly from South and S.S.E. till the 20th, in lat. 9° 30′ N., lon. 88° 40′ E., when a light N.E. monsoon commenced, with which stood to the north-westward, and on November 25th arrived at Madras. Had the steady N.E. monsoon been expected, which was experienced in 9½° N., this ship need not have gone so far to the eastward as stated above, and would thereby have shortened her passage a few days.* Passage of the James Sibbald.

Ships bound from Mauritius to Bengal Bay, in the S.W. monsoon, may steer to the northward and north-north-eastward, passing to the East of the Seychelle Islands,

* In the last section but one, it will be seen that the Sherburne had a long disastrous passage near the equator, where westerly winds were expected; which shows the uncertainty of this equatorial route for making progress to the eastward.

then through the One-and-a-half Degree Channel, or the Equatorial channel of the Maldivas, which is more direct than the passage to the North of the chain.

Passage from Bourbon by the One-and-a-half Degree Channel to Madras.

The Cornwallis, Captain Burnet Abercrombie, passed about 10 leagues to the eastward of the Island Bourbon, 1st September, 1784, then to the eastward of Galega and the Seychelle Islands, without seeing them. When near the equator, the wind veered to North, W.N.W., and West, with which she steered East on the parallel of 1° 30′ N., and passed through the Adoumatis, or One-and-a-half Degree Channel of the Maldivas, 27th September, being at 6 P.M. in lat. 1° 28′ N., lon. 73° 35′ E. by chronometer and lunar observations, without seeing any of the isles on either side. The westerly winds continued brisk, and enabled her to steer direct for Ceylon; saw the Great Basses on the 2nd of October, steered along the East side of the island, and arrived at Madras on the 8th of that month, having 11 days' passage from the Adoumatis Channel.

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# EAST COAST OF MADAGASCAR.

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THE EAST COAST OF MADAGASCAR, has been examined by Capt. Owen, and it is more frequented than formerly by English ships, since the Island Mauritius became a British colony: several of her Majesty's ships visits the ports on the East coast to obtain refreshments, or otherwise as duty renders necessary; along most parts of the coast, a bank of soundings extends from 3 to 5 miles off shore, containing few hidden dangers.

Fort Dauphin.

FORT DAUPHIN, the southernmost port on the coast, is in lat. 25° 1′ S., lon. 47° 2′ E. by Capt. Owen's survey; and Lieut. Evans, several years previously, made it in the same longitude. A ship bound to this place, should make the land to the northward of the port, on account of strong N.E. and E.N.E. winds, called *Fort Dauphin Winds*, which prevail greatly, forcing a current to the southward along this part of the coast, rendering it very difficult to gain the bay, if a ship fall to leeward. Between Fort Dauphin and Cape St. Mary, the South extremity of the island, the coast is generally bold, with soundings within a moderate distance of the shore.

Winds.

Currents.

In approaching Fort Dauphin, as the current sometimes sets 16 leagues in 24 hours to the southward, a ship should anchor in the night, to prevent being driven to leeward, if the weather is favourable, and the bottom not rocky.

To sail towards Fort Dauphin.

When the land is seen in lat. 24° S. you perceive a chain of very high mountains;* and in 24° 15′ to 24° 18′ S. a hummock, in the form of a sugar-loaf, is distinguished amidst some small hills near the sea. Sailing along the coast, at 2½ leagues distance, a reef may be perceived in lat. 24° 22′ S. which projects to a considerable distance from the shore; and a little farther southward, you discover, through St. Luce Islands, some small rocky shoals under water, at a considerable distance from the shore be-

* The perpendicular height of this chain is supposed to be nearly 3,600 yards above the sea level.

betweeen lat. 24° 35′ S. and 24° 45′ S. which require great care. Continuing to sail along at the same distance from the shore, a point will be discerned S.W. by W., appearing to stand by itself, with two hummocks, more flat than round; and after this, another point, with hummocks of the same shape. These two points have been often taken for Point Itapere, which is the next, or third in order, having sharp pointed hummocks. When you come near the second point, steering along the coast, at $1\frac{1}{2}$ leagues distance, there are shoals, some of which extend above 2 miles from the shore: it is therefore advisable to keep an offing of $1\frac{1}{2}$ leagues, or more.

Itapere Rock, whose breakers are always seen, is the surest mark to distinguish the Point, from which it is distant about 1 mile to the southward, but there is no passage between them; these breakers sometimes run very high. Itapere Rock.

Two leagues West from this rock, lies Fort Dauphin: the coast between Itapere Point and that on which the fort stood, forms a cove or bay, named Tolonghare, by the natives, and Anse Dauphine by the French, who were formerly settled there, and of whose fort the remains are still visible. Ships generally go within the elbow made by the point. Tolonghare or Anse Dauphine.

Having passed Itapere Rock, at the distance of a mile, or a little less, steer for Fort Dauphin Point, which is encompassed with a reef to the distance of a cable's length, having good anchorage within it. A good berth is with Point Itapere E. 5° or 6° S., and the extreme of the breakers nearest the anchorage S. E. by E., the larboard anchor to the N. E. in 7 fathoms, sandy ground; the starboard anchor in 6 fathoms, having 28 or 29 feet water under the ship; a third anchor is placed to the N.W. if requisite. Anchorage.

When there is not sufficient day-light to reach the road, having doubled Itapere Rock, you may anchor in any part of the bay, if the weather admit, observing that the quality of the ground is not everywhere the same.

Indifferent water is obtained at the landing place by digging in the sand, which may answer for cooking and for the stock; but at a small distance inland there are plentiful springs of very good water. Water.

To the southward of Fort Dauphin Point, there is a bay of foul ground, called Galleons Bay. The Point is even land, of middling height, and the country is mountainous inland to the N.W. of Fort Dauphin Bay. Betwen Fort Dauphin and Tamatave Road, there appears to be no place of shelter that will afford safe anchorage for ships, and, consequently, this part is less visited than other parts of the coast. Galleons Bay.

MANOOROO or MANOUROU, in lat. 19° 55′ S., lon. 48° 52′ E., is a town where it is said a ship might be sheltered inside of the adjacent reefs, but it seems too much contracted for large ships, and ought not to be chosen as a place of refreshment, unless in a case of necessity, in the fair weather season. Manooroo.

TAMATAVE, in lat 18° 10′ S., lon. 49° 28′ E. by Capt. Owen's survey, is a village on a low point of land, having good anchorage within the coral reefs, which secure ships from N. E., easterly, and southerly winds. Point Hastie, on which stands the town, is environed by a reef to the distance of nearly half a mile, and between the North point of it and the southern point of the North or outer reef, is the direct passage, rather more than a quarter of a mile wide, leading into the road, which has depths from 13 to 7 or 6 fathoms. The North reef extends about $1\frac{1}{4}$ miles North and South, and its southern point is about 3 quarters of a mile N. N. E. from the town. About half Tamatave.

a mile N. E. from the North end of the North reef, lies another small reef, having a passage between them of 6 or 7 fathoms water; there is also a passage of 10 and 12 fathoms close along the western side of the North reef, leading to the road. About 2 miles northward from the North extreme of the North reef, there is another small reef and sand bank, rather more than a mile S. by W. from Plum Island. To the southward of Tamatave from 3 to 7 leagues distance, several reefs exist about 3 or 4 miles from the shore, and about 3 quarters of a mile to the S. S. W. of Tamatave Reef, there is another small reef. High water here at 4 hours 18 minutes, and the rise of tide 8 feet at full and change of the moon. Variation 13° W. in 1825.

Tides.

PLUM ISLAND (Ile aux Prunes), in lat. 18° 3′ S. distant 2 miles from the nearest part of Madagascar, is covered with trees, seen at the distance of 5 leagues, and a reef projects about a quarter a mile from it to the northward, southward, and eastward: to the N. E. of the island about a mile, lies the South extremity of a reef, which extends another mile to the N. N. E. having overfalls near it.

Directions for sailing to Foule Point.

When southerly winds prevail, it is proper for ships bound to Foule Point to make this island, and as that place is often preferred to Fort Dauphin, on account of its greater facility and better anchorage, those bound there for refreshments may attend to the following observations.

The coast adjacent to Plum Island is low, covered with trees, and safe to approach having 8 and 7 fathoms water within a quarter mile of the shore. There is a rocky bank with breakers about 3 leagues N. N. E. from Plum Island, and 1½ leagues farther on the same bearing, a shoal with 3 fathoms water on it: 1 league to the N. N. E. of this, there is another with 4 fathoms, which dangers are about a league from the shore.

From Plum Island to Foule Point, the coast of Madagascar is of moderate height, uneven and woody, rising gradually inland, till double and treble mountains are seen at a great distance. The shore consists of white sand, lined with breakers, projecting 2 or 3 cables' lengths into the sea. When Plum Island bears N.W. about 2 leagues distant, you perceive on the North side, a small hill nearer the shore than the others, and forming two Paps; they are called the Paps* of Natte, from the village in that quarter, where the natives often hoist a white flag. Several vessels have mistaken this place for Foule Point, which lies 3 leagues farther North; but this error will be avoided, if you observe that Plum Island is visible from Natte, but cannot be seen from Foule Point; if, therefore, you bring the island to bear S. 30° W. when it is disappearing in the horizon, you may steer N. 15° E. for Foule Point, which is on this bearing.

These directions must be followed only during the season of the S. E. winds, for in the season of the N. E. winds, you ought not to make the land to the southward of the place to which you are bound.

Foule Point.

FOULE POINT VILLAGE, in lat. 17° 40′ S. lon. 49° 37′ E. by the survey, affords bullocks and refreshments; anchorage is formed by a large reef, which begins on the shore about 1½ miles to the southward of the village, and extends nearly a mile to the N. E. by E. ½ E. of the point. Come no nearer this reef than a quarter of a league, and range along round its northern point at the distance of a little more than a cable's length; the breakers are visible, but they show less at high water, and with a fresh

* These inland mountains, called also Foule Point Paps, which are marks for this place, lie about 15 leagues to the westward. There are four of them, but in coming from Plum Island only two are seen.

breeze. When round the North end of the reef, haul to the S.W., and anchor under shelter of it in 6 or 7 fathoms sand and mud, the North point of the reef bearing about E. by S. ½ S. and the village S. by W. about 1 mile distant. Ships moor E.N.E. and W.S.W., and if to remain a considerable time, it is proper to have a third anchor to the N.W. Within the reef, close to the point, there is a basin, where a ship might anchor in 4 or 4½ fathoms; but it is not very safe, and hemp cables are liable to be cut by the rocks. The variation here was 16° W., in 1824. Anchorage.

Foule Point should only be frequented in the fine season, when the Southerly and S.E. winds prevail, the reef affording no shelter against northerly winds, or stormy weather. The winds here are periodical, the S.E. and southerly, prevailing from April to October or November, and the N.E. or northerly winds during the rest of the year. This kind of monsoon is experienced in all these seas, from the equator to the parallels of Mauritius and Bourbon, and extends a considerable way to the eastward of these islands.

A certain sign of land in the season of the northerly winds, and during the greatest part of the year, is a large bank of black clouds, of an even appearance, which gathers during the day, and extends over Madagascar. When seen from the land, this cloud has about 10° of elevation above the horizon; it may be discerned at 12, 15, and 20 leagues distance from sea, and is a sure indication of your approach to the land. Indication of the proximity of land.

FENERIVE, in lat. 17° 28′ S. lon. 49° 23′ E. by Capt. Owen's survey, is a small town, situated at a concavity of the coast, where the anchorage is sheltered from southerly winds, in from 5½ or 6 to 7 fathoms, about 3 quarters of a mile or 1 mile off shore: there are 2 and 3 fathoms water close to the point where the town is built, but a little to the N.W. and S.E. reefs and islets project about half a mile from the shore. Variation 16° West in 1824. Fenerive.

ST. MARY ISLAND, the South point called Point Bleve, is in lat. 17° 7′ S. lon. 49° 45½′ E. by the survey, and about 12 leagues N.E. ¼ N. from the Road of Foule Point. This island, called by the natives Maligah, or Nossi Ibrahim (Abraham's Island), is a long and narrow island having its length parallel with the coast of Madagascar, and extending from lat. 17° 7′ S. to 16° 40½′ S. in a direction about N.E. ½ N. St. Mary Island.

Between this island and Madagascar, the channel is safe for ships of any size, the narrowest part being about 4 miles wide, having from 27 to 33 fathoms in mid-channel, and usually the depths are from 17 to 32 fathoms between the island and the main, throughout the channel, decreasing towards the shore in some places. Channel within it.

The narrow part of the channel is near the middle of the island, and formed by Larree Point, projecting about 8 miles beyond the other part of the Madagascar shore.

The South point of St. Mary is formed by a small flat isle, separated from the great island by a very narrow gut or channel; and a reef extends from the small isle about 1½ miles to the South and S.E. The whole of the eastern side of St. Mary is fronted with reefs of breakers and some sand banks 2½ or 3 miles off shore, the southernmost of which is about 3 or 4 miles from the isle that forms the South Point of St. Mary.

On the western side, about 7 miles from the South point, there is a bay, with an island called Quail Island at the entrance, where small vessels may find shelter. On it, the French had a factory, which they were forced to abandon in 1761, the place being unhealthy, and the natives treacherous.* To anchor at this place, steer along Anchorage.

* It was first settled by the French in 1740, and 120 men left there, who were three months after cut off by the natives. They re-possessed it in 1743; and again, in 1821, when they became exposed to the deadly in-

the S.W. end of St. Mary, in 18 or 20 fathoms, and having rounded a large black rock off the S.W. point of the Bay, anchor in 18 or 20 fathoms, with Quail Island bearing about S. by W. $\frac{1}{4}$ W., Point Larree will then bear nearly N. by E. $\frac{1}{4}$ E. distant about 3 leagues. The tide rises here 5 feet perpendicular; high water at 4 hours on full and change of the moon. The months most liable to storms or hurricanes, are January, February, and March.

Tides.

Tangtang.

TANGTANG or TEINTIQUE, in lat. 16° 42′ S. situated within the Island St. Mary about $3\frac{1}{2}$ leagues N.W. from Point Larree, is a bay or harbour, full of shoals at the entrance, having a channel between the reefs from a quarter to half a mile wide, with 8 and 10 fathoms water, and moderate depths for anchoring inside, in 5, 6, or 7 fathoms, sheltered from all winds, within the reefs at the southern part; but more securely in 4 or $4\frac{1}{2}$ fathoms inside of the peninsula that forms Point Tangtang, at the North part of the harbour.* High water at $4\frac{1}{2}$ hours; rise of tide 6 feet on full and change of moon.

Anton-gil Bay.

ANTON-GIL BAY, named Manghabes by the natives, takes its name from Antonio Gil, a Portuguese captain, supposed to be the first European who entered it.

From the North end of the island St. Mary, the entrance of this bay is distant about 11 leagues, bearing *true* North. It is about 13 leagues in length from North to South, and $6\frac{1}{2}$ leagues broad at the entrance between Cape Bellones and Durnford Noss, called formerly Point Baldrish, these bearing about E.N.E. and W.S.W. from each other. Cape Bellones, is in lat. 16° 14′ S., and Durnford Noss, the extreme point on the East side of the entrance of the bay, is in lat. 16° 0′ S., lon. 50° 11′ E., by the survey of Captain Owen.

Durnford Noss.

Directions.

In sailing towards Anton-gil Bay, in the southerly monsoon, pass through the channel between St. Mary and the main land, or to the eastward of the island at discretion; but in the northerly monsoon, do not make this island, for then, a direct course ought to be steered for the entrance of the Bay, and sail along either side of it as most expedient, the depths of water and quality of the ground being nearly the same, and the depths decrease to 30, 25, 20, and 15 fathoms, as the head of the bay is approached.

Anchorage.

Marosse, in lat. 15° 30′ S., is an island about 2 miles in extent, and $1\frac{1}{4}$ miles distant from the point of Tungumbaly River at the head of the bay, having four islets to the southward, the farthest of these distant from it about $4\frac{1}{2}$ or 5 miles. The common anchorage is to the northward or westward of Isle Morosse, at the distance of a musket-shot, opposite to two small sandy coves, in 11 or 12 fathoms, and called Hastie Road, by Captain Owen. Wood and water are procured here with great convenience, and tents may be erected safer than on the main, where you must trade for provisions. The river's mouth bears N. by W., from Isle Marosse, and is navigable by large boats, having $1\frac{1}{2}$ fathoms at the entrance, and 3 or 4 fathoms for a little distance inside. The anchorage to the N.W. of the river, is an excellent harbour, called by the French, Port Choiseul, where ships may anchor in 6 or 7 fathoms, close to the village of Maran Seetzly. The tide rises about 5 feet on full and change of moon; high water at 4 hours. Variation 11° W. in 1824. Rice, bullocks, &c. are procured here.

Tides.

fluence of the sickly season, which prevails from December until the middle of May, and in three months their numbers were reduced from 290 to 130 men.

* The plan of this harbour, and the other ports on the coast of Madagascar, published at the Admiralty from the surveys made under the direction of Captain Owen, in 1824 and 1825, will be found of the utmost importance to ships visiting those parts.

Departing from Anton-gil Bay, bound to the northward, steer along the eastern shore, taking advantage of favourable breezes with the ebb tide. At a small distance southward from Durnford Noss lies a small island called Behenter, to the southward of which ships may anchor when trading to this place. From hence, the coast extends about 2 leagues eastward, and is lined with a reef projecting 2 miles out, till it joins another islet called Nepatte; from this islet, the direction of the shore is about N.E. ½ N., for 3 or 4 leagues, then about N.E. ¾ N. to Cape East. *To sail from the Bay.* *N. E. coast of Madagascar.*

VENINGUEBE BAY, in lat. 15° 57′ S. about 1½ leagues to the northward of the East point of Anton-gil Bay, is about ½ a mile wide between the reefs that form the entrance. It appears unsafe, particularly for large ships. On the point of the reef forming the North side of the bay, which is very extensive, the French frigate La Gloire was lost, going out in 1761. *Veninguebe Bay.*

NGONCY or CAPE EAST, (outer islet), is in lat. 15° 16′ S., lon. 50° 31′ E. by Capt. Owen's survey, and the town is about 1½ or 2 miles to the N.W., the whole of the coast hereabout is lined with reefs, which in several places project 2 miles from the shore; it is, therefore, proper to keep at least an offing of 1 league in sailing along. From Cape East to Vohemar Point, in lat. 13° 24′ S. the direction of the coast is about N. ½ W., and N. by W. to N. by W. ½ W., from this Bay to Cape Ambre, the northern extremity of Madagascar. From Cape East to Cape Ambre, the land is generally high and uneven, except near the sea, in some places it is level, and of moderate height. The shore is rocky, with several islets and coral reefs in different parts, projecting 1, 2, 3, to 4 miles. *Ngoncy, or Cape East.*

NGONCY ROAD, or CAPE EAST BAY, in lat. 15° 13′ S., (the entrance) is 1½ or 2 miles to the North of the outer islet, formed between the reefs, and is about half a mile wide, with soundings of 5 to 8 fathoms; and at the southern part of the road there are 4 and 3½ fathoms about a mile inside of the entrance, where vessels might find shelter from all winds by the reef that extends to the northward from Cape East, excepting those that blow from N.E. to North. Ngoncy Town is situated at the South part of the bay, and Noabe Town is 1½ miles to the north-westward, upon the sandy peninsula that forms the southern side of the entrance of Noabe or Great River, which is shoal, and barred by reefs. *Ngoncy Road.*

VOHEMAR POINT is in lat. 13° 23′ S. lon. 50° 3′ E., and Manambatoo Village in lat. 13° 14′ S., lon. 49° 58′ E., by Captain Owen's survey, but there are no safe places for ships to anchor on this part of the coast. *Vohemar Point and Manambatoo.*

ANDRAVA BAY, in lat. 12° 55′ S., lon. 49° 56′ E., by the survey, is about 1¼ miles in extent, of circular form, with an island in the middle of the entrance, having depths of 4 to 6 or 9 fathoms on either side, but reefs project from the North and South extremities of these islands. This bay is open to North and N.E. winds, but there appears to be good shelter from East winds, in 4 or 5 fathoms, at the South extremity of the bay, about 3 quarters of a mile to the S.W. of Berry Head, which forms the eastern point. *Andrava Bay.*

PORT LEVEN, discovered and surveyed by Captain Owen, is formed on the East side by an extensive reef encircling five islands, and several rocky islets, which project *Port Leven.*

about 2 leagues to the North, from Point Liverpool, the N.W. boundary of Andrava Bay. Noshe How, the northernmost of these islands is in lat. 12° 47′ S., lon. 49° 53′ E., and Noshe Manambedy is another island about 3 miles to the N.W., also environed by a reef, and contiguous to the main land: between these two islands and their projecting reefs, is formed the entrance of Port Leven, about a mile wide, until about 2½ miles inside, where the channel is contracted to about half a mile, and continues nearly the same for 2 miles farther up the harbour, with depths usually from 8 to 6 fathoms even soundings throughout the port and in the entrance, between the reefs on either side, excepting a patch of 3 fathoms to the S.W. of the North point of Noshe How, and nearly in mid-channel. The course into the harbour is S. by W. for 2½ or 3 miles, then S. ½ E., in the upper part or inner harbour, which is sheltered from all winds; as is also a basin or large opening in the reef on the West side of the entrance near the main land, with depths from 6 to 3½ fathoms.

Ambre Mountain.

There is a high mountain inland, called Ambre Mountain by Captain Owen, the centre of which is in lat. 12° 37′ S., and it extends several miles North and South.

Port Looke, or Louquez.

PORT LOOKE or LOUQUEZ, in lat. 12° 46′ S., seems to be a safe harbour by Capt. Owen's survey; Point Bathurst that bounds the entrance on the East side, is in lat. 12° 44′ S., lon. 49° 47′ E., fronted by an extensive coral bank, betwixt which, and another to the westward, lies the entrance of the port; the latter bank having an island on its North part, called Noshe Kahoomby, or Sandy Island, which is about 3 miles long. When abreast the South end of this island about 1½ or 2 miles distance, the course is about S.S.W. between the reefs which form the entrance, and the distance about 5 miles to a safe cove or harbour, having an even bottom of sand from 5 to 9 fathoms, where ships are sheltered from all winds. The entrance leading to it is from half to a quarter of a mile wide, with deep water in it, from 20 to 40 fathoms; and no soundings 2 miles outside.

About 1½ or 2 miles above the harbour, at the head of the inlet, there is an inner harbour, having 4 and 5 fathoms sandy bottom, where the French vessels usually moored, when they visited this port. Between the outer and inner harbour, an extensive bank projects from the point on the eastern shore, about two-thirds across the channel, which makes it very narrow in this part. It is high water at 3½ hours at Point Bathurst, and the tide rises 7 feet. On the S.E. side of the point, there is a bay very open to the northward, called False Port.

Tides. False Port.

British Sound.

BRITISH SOUND entrance, is in lat. 12° 14′ S., lon. 49° 23′ E., by the observations of Captain Owen, of H.M.S. Leven, who surveyed this excellent harbour in 1824, it having been previously discovered by Captain Chapman, of H.M.S. Ariadne. Captain Owen gave it the general name of British Sound, but within the entrance it branches into several bays, named by him Irish Bay, Scotch Bay, English Bay, and Welch Pool. The entrance of the Sound is half a mile wide, with about 24 fathoms water close to its South side, and from thence to mid-channel; and shoaling gradually to 4 and 3 fathoms near to Clarence Island, which bounds the northern side, and is contiguous to the point of the main land; an extensive reef stretches from this point and Clarence Island, to other Islands at 2 and 3 miles distance. In the middle of the Sound there are 35 fathoms, shoaling gradually to the banks and shores of the bays inside. About 3 miles West from Clarence Island, nearly in the centre of the Sound, lies Chapman Rock above water, and there are some islets in the different bays, with brooks of water near the village a little within the entrance of the Sound, on the

South side. Variation 12° W. High water at 4 hours; rise of tide 4 feet at full and change of moon. Tides.

Diego Saurez Bay in lat. 12° 10′ S., and 4 miles to the North of the entrance of British Sound, is formed by an opening between the small islands and reefs, being half a mile wide at the entrance, but it was not examined by Captain Owen. Diego Saurez Bay.

CAPE AMBRE, the northern extremity of Madagascar, by Captain Owen's survey, is situated in lat. 11° 57½′ S., lon. 49° 19′ E., but it had previously been placed 5 or 6 miles more to the eastward by several navigators. In a run of 12 days, I measured 23° 36′ difference of longitude between it and Bombay Castle, by 3 chronometers, which would place it in lon. 49° 22′ E., allowing Bombay to be in longitude 72° 58′ E. Mr. Stevens, by mean of 200 lunar distances, measured to it by chronometers, made it in lon. 49° 25′ E.; and the mean of all the best authorities in my possession, would place it in lon. 49° 17½′ E. Ambre Mountain, already mentioned, is about 12 or 13 leagues to the southward of the Cape, and it is a regular sloping mountain. Windsor Castle, another mountain of less elevation than the former, lies in lat. 12° 13′ S., about 3½ leagues West from the entrance of British Sound; and several conical hills are interspersed betwixt the Sound and Cape Ambre; but this Cape is a low point of land, terminating in a ledge of rocky islets, having 15 fathoms close to them, and 20 or 25 fathoms about half a mile distant. Soundings of 18 and 20 fathoms are got near the shore, betwixt the Cape and British Sound, but the bank shelves off suddenly to no ground. Cape Ambre.

Relative to the eastern coast of Madagascar, it should be observed, that Fort Dauphin is generally healthy at all times. The coast towards Foule Point is unhealthy only in the bad season, the country is more so as you proceed northward. To preserve your crew from the diseases prevailing there during the unhealthy season, allow none of them to sleep on shore after November. Unhealthiness of the coast.

From Cape Ambre, the currents set generally strong to the westward all the year, towards the Comoro Islands and the Coast of Africa. Several navigators have experienced a set of 15 or 20 leagues in 24 hours to the westward. Currents.

# ISLANDS AND DANGERS NORTH-EAST AND NORTH OF MADAGASCAR.

Sandy Island.

SANDY ISLAND, or Ile de Sable, in lat. 15° 52′ S., lon. 54° 40′ E., is a flat sandy spot, about 15 feet above water, half a mile long from N.N.W. to S.S.E., and about $\frac{1}{4}$ of a mile broad, having a sand bank projecting $\frac{3}{4}$ of a mile towards the S.S.E. It was discovered by the ship La Diane in 1722; and in 1761, the Flute l'Utile* was wrecked there. Ships passing to the eastward of Madagascar, if not certain of their longitude, should be careful in crossing the parallel of this low and dangerous island.

The Alexander, passed on the West side of Sandy Island, within 5 or 6 miles of it, 3d January, 1810; the breakers on that side did not appear to extend far out from the Isle, which she made in lat. 15° 49′ S., lon. 54° 48′ E., by chronometer. Captain Owen gives its centre in lat. 15° 53′ S., lon. 54° 36′ E.

Captain Moresby, visited this island 6th March, and again on the 24th of July, 1822, having at this time reached it after a run of only 40 hours from Port Louis, and 60 hours from the same place at the first time to this isle, which he made in lat. 15° 51$\frac{3}{4}$′ S., lon. 54° 33$\frac{3}{4}$′ E., by chronometric measurement from Port Louis, and in lon. 54° 38′ E., by observations ☉☾. He found it to be very low and sterile, about $\frac{3}{4}$ of a mile in length, with a reef extending from the South point. The North point appeared to be a steep sand bank, up which the sea rolled a considerable distance. Off the N.W. end, about 1 mile distant, the boat sounded in 11 fathoms uneven bottom, sand and coral; which soundings are on a spit that extends a mile or more in a N.W. direction. The Wizard rounded the island on the West side, whilst the Menai did so on the East side at half a mile distance, and except on the spit mentioned, could not obtain soundings with 100 fathoms line. The wreck of a vessel, apparently of 140 tons, lay half embedded in sand, and from her position and aspect, probably had been several years in this situation. There was also a small hut and flagstaff on its eastern end; the people who erected these were taken off by H.M. sloop Harpy.

Cargados Garajos.

CARGADOS GARAJOS,† consists of a chain of low islets or sand banks, from 8 to 12 feet above water, with channels between some of them, having anchorage on the N.W. side to leeward of the isles.

Position.

The North Isle, by the French account, is in lat. 16° 28′ S., lon. 59° 31′ E., having on it some shrubs, wild salad, and plenty of good water. A great variety of fine

* This ship had on board 80 blacks, men and women; the whites, who composed the greatest part of the crew, arrived safe at Madagascar after a short passage, in a flat-bottomed boat they made out of the wreck. The blacks were left on the island, with a promise of speedy relief, who all died except seven women; these remained on it 15 years, living on the shell-fish they could pick up, with now and then a turtle, and having nothing but brackish water to drink. Captain Tromelin, of the ship La Diligente, had the courage and good luck to land on this dangerous spot, and brought them back to Mauritius in 1776.—Abbé Rochon's Voyage.

† In 1812, an inundation of the sea, it is said, nearly proved fatal to the few fishermen residing on these isles.

fish may be caught in abundance at the edge of the reef, and there used to be a few Europeans, and 30 or 40 negroes on the isle. Soundings.

Soundings extend 7 or 8 leagues to the north-eastward of this isle, and continue to increase in a N.N.E. direction to 80 or 90 fathoms on the North end of the Bank of Cargados Garajos, called also Nazareth Bank, which extends about 56 leagues in that direction from the Islands, as will be found in the sequel of this description.

Route of the Semilante.

An English commander, who was captured by the Semilante, French frigate, states, that coming from the eastward, and after getting soundings on the Bank in the Semilante, they steered westward, the soundings regularly decreasing in a run of 6 or 7 leagues, and having got into the proper latitude, they passed between the largest north isle of Cargados Garajos and another sandy isle to the northward of it; after hauling round the extremity of the reef until the *tuft of trees* bore about S.E., she anchored in 15 fathoms sandy bottom, with the watering place bearing about East.

The Semilante, with four prizes, remained a month here, waiting for intelligence from Mauritius; the people ate the wild salad that grew on the isle, caught plenty of fine fish close to the edges of the reefs, and were very healthy.

From this place they steered to the southward 6 or 8 leagues, till clear of the numerous sand banks, the southernmost danger being in lat. 16° 48′ S.; they were obliged to bear away for one shoal and haul up for another, but there are safer passages by steering out in a westerly direction.

Directions.

A ship coming from the eastward may haul to the northward of all the banks, and run down to the West of them, which passage is free of danger, excepting the *visible reefs*, with breakers on them. A shoal bears West 6 or 7 miles from the north point of Sandy Island.

H. M. Ships Cornelia and Sir Francis Drake visited this chain of islets and shoals in January, 1810, and Lieutenant J. Henderson, an excellent observer, determined their situation as follows:—

Position by Lieut. Henderson.

South Islet anchorage, in lat. 16° 47′ S., lon. 59° 34′ E., by ⊙ ☾ and 59° 33′ E. by chronometer.

North Islet anchorage, where there are several huts, in lat. 16° 27′ S., lon. 59° 39′ E., by chronometer, and 59° 40′ E., by ⊙ ☾. On this islet there is brackish water, but none at the South islet; fresh water being procured at an islet called Water Isle, which bears S. by E., 7 miles distant from North Islet.

South Islet Flagstaff, bears S. 27° W. from North Islet Flagstaff, distant 23 miles. The south point of the shoal bears from its north point S., 20° W., distant 30 miles These are *true* bearings, the variation of the compass being 9° westerly.

This narrow chain of islets and reefs is steep to on the east side, having in general 32 or 34 fathoms water within a quarter or half a mile of the breakers; but the west side is not so steep, and may be approached in several places to 18 or 20 fathoms.

The unfortunate loss of the Company's ship Cabalva, with Captain Dalrymple and part of her crew, on the shoals of Cargados Garajos, by crossing their latitude in the night, when correct observations were not obtained for ascertaining the longitude of the ship, and the chronometers being faulty, shows the necessity of great caution when approaching the parallel of these dangers in the night.

H. M. Ship Magicienne brought the survivors to Mauritius, and while she remained at the wreck of the Cabalva, made the Bank of Cargados Garajos extend from lat. 16° 9′ to 16° 52′ S., and from lon. 59° 25′ to 59° 50′ E.

Positions, &c. by Lieut. Hay.

Lieutenant Hay, of H.M.S. Menai, in April, 1821, anchored off the South Isles in lat. 16° 47′ S. The northernmost isle, called St. Pierre, he made in lat. 16° 11′ S.,

between which and a small sandy isle N.N.E. of the North Isle anchorage, there is a good passage, by hauling round inside of a coral patch which generally breaks two or three miles W.N.W. of North Anchorage Isle. The southern reef extremity is in lat. 16° 55′ S. From the eastern edge of the reef to the westernmost dangers is about 11 miles, and the meridian assigned to the North Isle 59° 39′ E. will pass through the centre of the group.

The Huddart's remarks.

The Huddart, 25th December, 1810, made the South islet in lat. 16° 47′ S., lon. 59° 31′ E. by chronometer, and after tacking from the East side of the chain, she stood 28 miles to the southward, then tacked to the N.E., and weathered the islets and dangers without seeing them. At 2 P.M. 27th, she sounded in 25 fathoms coral, in lat. 14° 50′ S., lon. 61° 1′ E. by chronometer and noon observation; steered from hence N.E. ½ N. 26 miles, and sounded in 21 fathoms at 8 P.M.: steered N.E. ½ N. 33 miles, till 3 A.M., in soundings from 21 to 32 fathoms coral and weed, which was the last soundings, then in lat. 13° 41′ S., lon. 61° 15′ E., after steering 13 miles to the northward, had no ground at 80 fathoms. These soundings of the Huddart, were on the NAZARETH BANK, which is thought to be a continuation of the Bank of Cargados Garajos, although it is uncertain whether or not they be separated by deep water chasms.

Nazareth Bank.

Captain Smyth, when an officer on board H. M. S. Cornwallis, November 10th, 1808, in lat. 13° 56′ S., lon. 60° 59′ E., by three chronometers, had soundings on Nazareth Bank, 20 fathoms, sand and coral, and carried from 19 to 40 fathoms until the 11th at noon, in lat. 14° 54′ S., lon. 60° 53′ E., then carried from 40 to 25 fathoms steering to the S.S.W.; and after having no ground at 60 fathoms, again got soundings of 40 to 23 fathoms; at noon, the 12th, in lat. 17° 1′ S., lon. 60° 17′ E., had no bottom at 80 fathoms.

The Ganges, Captain Falconer, 22d February, 1817, saw a *low sandy isle*, bearing S. 20° W., distant about 7 miles, then in lat. 16° 12′ S., lon. 52° 49′ E., by observation of ⊙ and ☾, in soundings 20 fathoms, sand and coral; from this situation steered East about 28 miles till 11 P.M., had then 45 fathoms, and shortly afterwards got off the Bank of Cargados Garajos. February 26th, at 9 P.M., again got soundings 30 fathoms, white shells, in lat. 15° S., lon. 60° 40′ E., by chronometer, and continued in soundings of 20 to 30 fathoms till 8 A.M., steering N. by E., and at noon lost soundings in lat. 14° 14′ S., lon. 60° 43′ E.

The Acteon, Captain Mackie, 16th March, 1816, at 7 A.M., in lat. 15° 20′ S., lon. 60° 14′ E. by chronometer, got soundings 35 fathoms, sand and coral: steering from hence N.E. by E. and E.N.E., had generally from 25 to 16 and 14 fathoms till 7½ P.M., when a strong smell of sea-weed was experienced, as if passing under the lee of a shoal or reef of rocks: at this time, the lat. 14° 30′ S., lon. 61° 23′ E. by chronometer; shortly after, deepened to 40 fathoms at 8 P.M, and at 9 P.M., lost soundings, steering N.E. by E. as before.

Saya de Malha Bank.

SAYA DE MALHA BANK (or Coat of Mail), has lately been found to extend above a degree more to the northward than formerly supposed. Its southern extremity is thought to be in about lat. 11° 30′ S., and its northern extremity is known to extend to lat. 8° 18′ S.

H. M. Ship Galatea, 26th July, 1811, got upon a bank of 9 and 10 fathoms, the coral rocks distinctly seen under the ship, in lat. 8° 35′ S., lon. 59° 58½′ E., by chronometer, and the bank appeared to extend East and West about 5 miles.

This was probably the north-western patch of the Saya de Malha, which appears at

the N.W. and western parts, to consist of detached* large coral patches, with deep water between them; for several of the Company's ships have had soundings near the same situation, and carried them far to the northward, and also to the eastward. The Lady Carrington, in July, 1814, got soundings of 12 and 13 fathoms, on Saya de Malha, in lat. 10° 30′ S., lon. 61° 50′ E. by chronometer, and steered from thence N. N. E. and N. E. by N., deepening regularly on these courses to 75 fathoms, in lat. 9° 43′ S., lon. 62′ 20′ E., then lost soundings: the Bank, therefore, seems to be of great extent in longitude, as well as in latitude.

Positions and soundings on the bank.

| | | Lat. S. | Lon. E. | |
|---|---|---|---|---|
| | | ° ′ | ° ′ | |
| Northumberland, Jan. 1, 1811, had soundings on the bank in | | 9 19 | 60 26 | By lunar observations agreeing within three miles of chr. |
| She had from | 7 to 10 fathoms coral | 9 3 | 60 43 | |
| | 18 ditto | 8 55 | 60 38 | |
| | 40 ditto | 8 51 | 60 37 | |
| Huddart, in December, 1810, had | 32 ditto and sand | 10 44 | 60 44 | By chron. |
| | 14 and 15 ditto | 9 55 | 60 56 | Then no ground steering N. by E. |
| Preston and Phœnix in company, December, 1810, | 10 ditto | 9 45 | 60 32 | By the Phœnix chronometers. The Preston's chronos. made the lon. about 15 miles more easterly |
| | No ground | 9 42 | 60 31 | |
| | 6$\frac{3}{4}$ & 7 fath. coral | 9 21 | 60 14 | |
| | 9$\frac{3}{4}$ & 10 ... ditto | 8 44 | 60 10 | |
| | No ground | 8 42 | 60 10 | |
| | Ditto | 8 31 | 60 7 | |
| | 12 & 13 fath. coral | 8 30 | 60 5 | |
| | 12 to 15 ... ditto | 8 19 | 60 3 | |
| | No ground | 8 17 | 60 3 | |
| Marchioness of Ely & Lady Carrington in July, 1814, | Had 49 fathoms | 10 58 | 61 40 | Chron. from Port Louis. |

From this situation, the last named ships steered north-eastward, in soundings from 41 to 20 fathoms, till in lat. 10° 25′ S., lon. 62° 10′ E., and from hence to lat. 10° 0′ S., lon. 62° 20′ E., had regular soundings of 12 to 14 fathoms, then deepened gradually to 75 fathoms, in lat. 9° 44′ S., lon. 62° 30′ E., which was the last soundings got on the eastern edge of the bank, steering N.E.

The bank is also of great extent East and West, as appears by the soundings and observations of these ships, which have also been confirmed by others. Extent.

The Brig Tweed, January 14, 1817, at 6 A.M., saw the rocks under the stern, and had from 13 to 9 fathoms, coral rocks, steering N. Eastward with a light breeze till 11$\frac{3}{4}$ A.M., then suddenly no ground; at noon, observed, lat. 8° 18′ S., lon. 60° 46′ E., by chronometer, from Mauritius. H. M. S. Cornwallis, June 10th, 1806, at noon, observed lat. 9° 47′ S., lon. 61° 13′ E. Variation 6° 20′ W., at 10 P.M., steering N. E., sounded in 40 fathoms on Saya de Malha; and thought we were well advanced on it; at 12 P.M., had 42 fathoms, and generally 45 to 37 fathoms till 11 A.M., passed over a

* The doubtful bank, called St. Michael's, is probably only one of the N.W. patches of Saya de Malha, as the situation assigned to it is nearly where the Galatea had soundings.

In lat. 17° 10′ S., lon. 58° 18′ E. by chronometers, breakers were thought to have been seen by Captain Ball, of the Biramgore Grab, which might probably be occasioned by ripplings, although he considered them to be on a shoal.

knowl or patch in 10 fathoms, red coral and shells, the bottom clearly seen, having from 9 to 8 and 7 fathoms, nearly 3 quarters of an hour; afterwards lost soundings with the hand-lead, and at noon 11th, observed lat. 7° $23\frac{1}{2}'$ S., lon. 62° 24′ E., having experienced a current S. 75° W. 39 miles, since the preceding noon.

The Ganges, Captain Falconer, after having sounded on the Cargados and Nazareth Banks already mentioned, got soundings 40 fathoms on Saya de Malha at 8 A.M., 4th March, 1817, and shoaled gradually to 15 and $14\frac{1}{2}$ fathoms at noon, then in lat. 10° 37′ S., lon. 62° 10′ E. by chronometers, having run 9 miles E. N. E. from 8 A.M., till noon; shortly afterwards lost soundings, by which it appears that this edge of the bank is steep, with rather shoal soundings, and extends farther to the eastward than generally supposed.

The ship Colombo, 2d January, 1822, got 70 fathoms on the Saya de Malha in lat. 10° 57′ S., lon. 61° 3′ E., and steered to the northward upon it; in lat. 10° 15′ S., lon. 61° 20′ E., she had 21 fathoms; in lat. 9° 50′ to 9° 47′ S., lon. 61° 21′ to 61° 29′ E., carried soundings of mostly 8 and 7 fathoms rocky ground, and had twice only $6\frac{3}{4}$ fathoms on separate patches about 4 miles distant from each other. The rocks were distinctly seen under the ship whilst sailing over this shoal part of the bank, appearing in large white patches.

The ship Charles the Second, from Bombay, bound to England, 25th February, 1698, got soundings 45 fathoms ooze, on Saya de Malha, in lat. 10° 34′ S., and hauled up E. S. E., thinking themselves on the eastern edge of it. Having run 27 miles E. S. E. in soundings not less than 40 fathoms, then at 1 A.M., shoaled fast to 12 fathoms, coral and shells; and thinking they were rather on the West than on the East side of the bank, tacked, and steered W. by N. to N.W. till day-light, deepening to 43 fathoms ooze, as before. At day-light steered S.W. with a fresh N. E. wind, and at noon shoaled again to 14 fathoms coral rock and weeds; afterwards deepened gradually to 50 fathoms, having run 31 miles on a S.W. course, then got no ground with 60 fathoms of line.

Navigators are still left in a state of uncertainty, whether or not any part of this bank is dangerous, but as the Cornwallis had 7 fathoms, the Northumberland 7 fathoms on another part, the Preston only $6\frac{3}{4}$ fathoms coral rock, on a different part, and the Colombo $6\frac{3}{4}$ fathoms on the eastern edge, caution ought certainly to be used by those who happen to get upon this bank; more so, as a French navigator of the island Mauritius states, that there are dangers on the southern extremity, where a ship would be liable to strike on some of the coral patches; and the Eliza, French schooner, is said to have been in 4 fathoms, close to breakers on this part of the bank.

Uncertain if dangerous.

Agalega.

AGALEGA, or GALEGA, was examined by Captain Briggs, of H. M. S. Clorinde, 12th of January, 1811. The landing was found difficult, on account of the heavy surf, the island being surrounded by a reef. A person who formerly had commanded a French privateer, was at this time settled on the island, having under him a colony of negroes, who cultivated part of the ground with maize, wheat, &c.

This island is little more than a mile in breadth, extending about 11 miles nearly N.W. and S. E., all low land,* with a gap in the middle, where the sea breaks through on high tides, which gap gives it the appearance of two islands, if viewed at a distance. The north end was found to be in lat. 10° 20′ S., lon. 56° 37′ E. South end, in lat. 10° 31′ S., lon. 56° 40′ E., by the chronometers of the Clorinde and Minerva in company.

Position.

* The trees on it may be seen at 5 leagues distance.

The ship Sir Stephen Lushington passed in sight of this island 28th January, 1811, and made it in lon. 56° 39′ E. by chronometer.

Captain Moresby, 29th August, 1821, visited this island, and landed on the N.W. point, which he made in lat. 10° 21′ S., lon. 56° 32′ E. by chronometers, from Port Louis; and although he had not time to examine the S.E. point, he states, that the eastern extremity of the reefs extends to lon. 56° 42′ E. At this time, a schooner was at anchor in 8 fathoms water, two cables' lengths from the shore, under lee of the N.W. point. Some navigators think this island to be situated a little farther East than the longitude herein described. Captain J. Hine's chronometers made it in lon. 56° 50′ E., and Captain T. Hutcheson, of the ship Hero of Malown, made it 2 or 3 leagues farther East than the last mentioned longitude. Variation 9° 40′ West in 1821.

JUAN DE NOVA, extending from lat. 10° 5½′ to 10° 26′ S., the centre in lon. 51° 2′ E., is the southernmost of the groups of islands, north-eastward from Cape Ambre; and it is an elliptical chain of low islets and reefs, extending N.E. and S.W. 6 or 8 leagues, having a basin in the centre, with 7 or 8 feet water on the bar leading to it; at the North part of the chain, where is good ground for anchoring. The soil of these islands is mostly coral, on which grow trees of small size. Turtle and fish of various kinds, are plentiful, and some fresh water is to be obtained by digging. The tide sets about N.E. and S.W., and rises 4 or 5 feet. Juan de Nova Group. Tides.

Capt. Moresby, of M.M. Ship Menai, 26th July, 1822, anchored at the northern part of Juan de Nova in 17 fathoms sandy bottom, and made the anchorage in lat. 10° 7′ S. by good observations, lon. 51° 5′ E. by three chronometers, measured in a run of 84 hours from Port Louis. By the same means, he made the extreme of North Reef in lat. 10° 6′ S., lon. 51° 7½′ E. Northwest Isle, in sight of the ship, lat. 10° 11′ S., lon. 50° 59′ E. South extreme, lat. 10° 26′ S., lon. 50° 54′ E. Variation 8° 30′ W. Some lunar observations gave the lon. 51° 21′ E., but as the weather only admitted a few sights to be taken, Capt. Moresby thought the chronometers gave the true longitude. He remained at anchor here till the 29th, turning turtle, the wind fresh from S. Eastward; the flood tide then ran N.N.E. 1½ miles per hour, and the ebb to the S.W. Water was got by digging in the sand, at the depth of two butts.

Capt. Hugh Scott, of the Company's ship Charles Grant, 8th of May, 1819, at 4 P.M., saw the western part of this group bearing E. by S. 3½ or 4 leagues distant, which part he made in lat. 10° 15′ S., lon. 50° 54′ E. by chronometers, measured from lunar observations, corresponding nearly with the longitude stated above, by Capt. Moresby.*

The group called the TWELVE ISLANDS, *said* to be situated about 10 leagues to the N.W. of Juan de Nova, seems to be one and the same group; John de Nova, consisting of two islands of considerable extent, and ten small ones, making twelve in number. Twelve Islands.

ST. PIERRE, in lat. 9° 20′ S., lon. 50° 48′ E. by Captain Moresby's observations, who visited it in 1822, was found to be a low island, about 1¼ miles long, bearing W.S.W. from Providence Island: it is peculiar from being cavernous; the sea is St. Pierre.

* Captain Franklin, of the Northumberland, in June, 1810, made the western part in lon. 51° 21′ E. by lunars, and the mean of six ships of the fleet at the same time, made it in lon. 52° 2½′ E. by their chronometers, but this appears to be *above one degree* to the eastward of its longitude, as determined by Capt. Moresby.

thrown a great height through the caverns, appearing, at a distance, like whales blowing near it. Its formation differs from the neighbouring islands, having a thin bed of soil resting on rock which is neither granite nor lime-stone. The anchorage for small vessels is close to the reef, the bank not extending a cable's length. Variation 8° 52′ W. in 1822. The tallest trees on it are scarcely 10 feet high, but may be seen 5 or 6 leagues distant. It is the nearest island on the eastern side of the channel, in steering from Cape Ambre to the northward for India.

Providence Island.

PROVIDENCE ISLAND, in lat. 9° 10′ S., lon. 51° 5′ E. the North point, by Capt. Moresby's observations, is low, about two miles in length North and South: water is got by digging in the sand. There is anchorage on the West side half a mile from the shore upon uneven ground, sand and coral. The tide rises and falls 8 feet, high water at 3 hours 30 minutes on the shore, at full and change of the moon. The North part of the island is covered with cocoa-nut trees, and the South part with a spungy tree, resembling the fig-tree, and growing to the height of 40 or 50 feet. Turtle are plentiful, and land crabs of large size, which are considered palatable and wholesome food. The reef which surrounds the island, begins at the North end, and projects $1\frac{1}{2}$ miles from the southern extremity, nearly joining Providence Reef, to be described hereafter, which extends 6 or 7 leagues to the southward.

Tides.

St. Pierre and Providence Islands, were seen by Capt. Driscoll, in the ship Lonach, bound from London to Bombay, who passed between them, on the 11th September, 1818. At 11 A.M., St. Pierre bore N.N.W. distant 4 leagues: at noon, it bore W. by S., the observed lat. 9° 24′ S., which made the Island St. Pierre in lat. 9° 28′ S., lon. 50° 42′ E. by two chronometers, corrected from Cape East Madagascar, in a short run of two days. Same time, saw Providence Island bearing E.N.E., about 4 leagues, which will place it in lat. 9° 13′ S., lon. 50° $58\frac{1}{2}$′ E. Passed through the channel between these two islands, which appeared safe; they bear nearly N.E. and S.W. of each other, and have reefs projecting from their extremities.

Providence Reef.

PROVIDENCE REEF extends about 7 leagues to the southward of Providence Island, and its S.W. extremity lies in lat. 9° 34′ S., lon. 50° 55′ E. by Capt. Moresby's observations and chronometers, who on the 29th July, 1822, steered from the anchorage of Juan de Nova N. by W. 32 miles, then had the S.W. extremity of Providence Reef bearing N.E. by N. 3 or 4 miles. He steered N.N.E. 14 miles along the West side of the Reef at half a mile distance, without obtaining soundings, then saw Providence Island, and shortly afterwards St. Pierre. There are two small Islets on Providence Bank, which have apparently been mistaken for the Isle St. Lawrence; and Providence Island has also been mistaken for St. Lawrence, which seems to have no existence.

The greatest breadth of Providence Reef, near the middle, is about 2 leagues, by the French account, the whole space within being filled with banks of sand and coral, several of which are above water, so that it is scarcely passable in a canoe at low tide. The French frigate L'Heureuse, was lost here, after sailing from Mauritius 30th August, 1769, for Bengal; she passed in sight of John de Nova on the East side, about 5 leagues distance, September 5th, and on the following night she struck on the South part of the Reef, and went to pieces. The crew got upon a dry sand a league within, from which they came to a small island joined with the Reef, and about 7 leagues to the northward of its southern extremity, to which they gave the name of Providence Island. After having remained two months on this island, the crew, 35 in

number, left it November 8th, in a boat which had been lengthened 5 feet; and with the help of N.E. winds, they landed four days after on Madagascar, 8 leagues to the South of Cape Ambre.

COSMOLEDO ISLANDS were visited by Capt. Moresby, 31st of July, 1822, who made the circuit of the group within a mile of the reefs, the Wizard passing to the southward, and the Menai to the northward, but did not get soundings at that distance. This group consists of a ring of coral about 10 leagues in circumference, a quarter of a mile in some places, and others interspersed with islets and banks, inclosing a magnificent lagoon, into which there did not appear a single opening. The S.W. isle was named Isle Menai, its position being correctly ascertained; it is more elevated than the others, and has on it some coco-nut and other trees. At noon, when within a musket-shot of the centre of Isle Menai, observed the lat. 9° 40′ 55″ S., lon. 47° 36¼′ E. by chronometers. Variation 11° 51′ West. Cosmoledo Islands.

The geographical position of the group is as follows: North point, lat. 9° 38′ S., lon. 47° 41½′ E. South point, lat. 9° 46′ S., lon. 47° 42¼′ E. East point, lat. 9° 42¾′ S., lon. 47° 44¼′ E. West point, lat. 9° 41′ S., lon. 47° 36′ E. These Isles are sometimes resorted to for fish, and a few blacks are left on them, who wait the vessels' return. On the southern side there is a small patch of sand, where small vessels may anchor, during the northerly monsoon. Position.

ASTOVE, or ASTOVA, in lat. 10° 6½′ S., lon. 47° 48′ E., by Capt. Owen, and distant 8 leagues to the southward of the Cosmoledo Islands, is a small low island, upon which the French ships, Le Bon Royal, and La Jardiniere, are said to have been wrecked. Capt. Moresby thinks it is situated in lat. 10° 13′ S., lon. 47° 31′ E., but he did not see it, having been carried to the N.W. by the current when endeavouring to steer for it. Astove.

GLORIOSO ISLANDS, two in number, are low and small, situated on a reef, about 38 or 40 leagues to the W.N.W. of Cape Ambre. Capt. Moresby, in the Menai sloop of war, touched at these islands in 1821, and made the eastern one (Ile du Lise) in lat. 11° 32′ S., lon. 47° 39′ E., and the western one (Ile Glorieuse) in lat. 11° 35′ S., lon. 47° 30′ E., by observations of sun and moon, nearly agreeing with chronometer. Capt. Owen places Ile Glorieuse in lat. 11° 35′ S., lon. 47° 24′ E. They are covered with brush-wood and trees 20 or 25 feet high, and are about 15 feet above the sea level, connected by a coral bank nearly 3 miles in breadth in some places, which space is filled with small isles, sand banks, and lagoons, through which no passage appears, neither could soundings be got with 100 fathoms 1 mile from the reef, on which the sea breaks with great violence. Ile Glorieuse, on which the boat landed, is about 1¼ miles long and 1 mile broad: a small basin is formed in its eastern end by a curve of the sand bank, where a small vessel might probably find shelter, in which is 7 fathoms water, but with a rocky and uneven bottom. Turtle and birds are plentiful, but no fresh water, although it might perhaps be found by digging. Ile du Lise is not more than a mile in length, but has a very extensive reef stretching off it in a N.E. direction. On account of the strength and uncertainty of the currents, these islands should not be approached but with a commanding breeze. The whole of these dangers appear to extend in an E. by N. and W. by S. direction, about 15 miles. The tide rises about 10 feet. Variation 13° 15′ W. (1821.) Glorioso Islands. Tides.

Marquis of Huntly Bank.

MARQUIS OF HUNTLY BANK, called also McLeod Bank, was discovered on the 28th March, 1818, by Capt. D. McLeod, in the ship of that name, with the Duke of York in company, bound to Bombay, and is in the fair track from Cape Ambre to the northward. The Journal states, that steering N. by E. with a light breeze at S.S.W. the rocks were observed under the ship's bottom at 7 A.M., and had 10 fathoms; the breeze being light and the water clear, stood on till 7½ A.M., in 10, 10½, 11, and 13 fathoms, then hove to, and sent two cutters, one to the northward, which deepened gradually from 13 to 40 fathoms about 1¼ miles from the ship, then no ground at 40 fathoms. The other cutter, which went to the eastward, deepened from 13 to 20 fathoms, then no ground at 30 fathoms, about 1 mile from the ship. The Duke of York hove to, bearing S.S.W. ½ W., about 2 miles distant, and showed soundings 10, 13, and 17 fathoms. At 8½ A.M., bore away, and steered N. by E., keeping a cutter a-head of the ship until 9½ A.M., having run 4 or 5 miles N. by E. from 7 A.M., when first sounded: after 9½ A.M., got no soundings at 75 and 105 fathoms.

Position.

When hove to, on the bank at 7 A.M., were in lat. 9° 57′ S., deduced from observation at noon, lon. 50° 18¾′ E., by chronometers measured from lunar observations taken 29th and 30th March, and 1st of April. The mean result of various lunar observations taken before and since the 28th March, measured to the position in 13 fathoms, places that part of the bank in lon. 50° 20′ E., latitude stated as above; and the last soundings of 40 fathoms in lat. 9° 53′ S., and on the same meridian. Probably this bank is not dangerous, as the ship appeared to pass over the shoalest part, by the water deepening all round, but there was not means of forming a correct opinion of its extent. During the morning, no appearance of shoal water or breakers could be discerned from the mast-head, but only ridges of strong ripplings at short distances from each other, in one of which the boat found the water much agitated, but no ground was got at 40 fathoms; here, the current was found setting strong to N.E., and when out of the rippling, it appeared to set weakly to N.N.W.

While in soundings, the ship was surrounded by many sharks and rock-cod, several of which were caught, and the bottom seemed to be white coral rocks in ridges, with *apparently* deep chasms between them; but from the regularity of the soundings, this was occasioned by the various colours of the coral.

Assumption Island.

ASSUMPTION ISLAND in lat. 9° 43′ S., lon. 46° 33′ E., by Capt. Moresby's observations in August, 1822, and distant about 18 leagues westward from Cosmoledo Group, is low, with some sand downs, covered with shrubs, being about 7 miles in length, according to the French plan, extending nearly E.S.E. and W.N.W. Mr. Morphey examined it, August 15th, 1756, and anchored on the West side; on the North and East sides, it is fortified by a steep coral reef. From Isle Menai of the Cosmoledo Group, Capt. Moresby made a *true* course N. 88° W., 53½ miles, when Assumption bore S.W. by W. 2 miles. By Capt. Owen, the Hummock on the S.E. point, is in lat. 9° 46′ S., lon. 46° 34′ E.

Aldabra Islands, French account.

ALDABRA ISLANDS, called also Aro, Arco, Atques, and Aldabra, are three in number, joined by islets and rocks, making them appear as one island. A basin is formed between them, having an opening to the eastward. After leaving Assumption, 18th of August, 1756, M. Morphey discovered the Aldabra islands, and found their lat. 9° 24′ to 9° 35′ S.

These were probably the islands seen in the Asia, which ship made Cape Basses,

20th November, 1766, homeward-bound from Bombay; light winds followed, with frequent strong ripplings, and at noon, December 15th, a low island bore from W. by S. to W. by N. ½ N. distant 2½ or 3 leagues; observed lat. 9° 19′ S., which made the island in lat. 9° 21′ S. It seemed covered with tufts of trees, or shrubs on the East side, steep to, without breakers, having red cliffs on that side, and appeared to extend E.S.E. and W.N.W. 6 or 8 miles in length, and 3 or 4 miles in breadth. From noon she steered S. by E. 8 miles, with the wind westerly, squally and rain, when at 2 P.M., 16th December, another island was seen from the mast-head, bearing S.W. about 8 leagues. At sunset, it had the appearance of a hummock, bearing West, with low land extending from it W. by N. ½ N., distant 4 or 5 leagues. Hove to during the night. At sunrise the island bore from W. ½ S. to S.W. by W., distant about 3 leagues; the wind being from the southward, she could not weather it, bore away to the N.W., and passed between it and the island seen the preceding noon. At 8 A.M., the body of the southernmost island bore South, distant about 2 leagues; same time the body of the other to the northward bore North, distant about 6 leagues. At noon, 16th, observed lat. 9° 44′ S. the southernmost island, distant 4 or 5 leagues, the hummock bearing E. ½ S., which makes it in lat. 9° 42′ S. This island is low, with a small hummock near the centre; it consists of white sand, with a few shrubs, about 4 miles in length East and West; a sand, with breakers, projects about half a mile from the East point, but no other breakers were seen, nor had she any soundings near these islands, which were supposed the Atques or Aldabras. From thence the Asia had light winds, and four days after, passed Mayotta on the East side, at 6 leagues distance, without perceiving any shoals or dangers: she got on the Pracel Bank the second day after passing Mayotta, and continued on it a whole day, steering to the S.W. and westward. Afterwards, she saw the island Juan de Nova, and the Bassas da India; from the former to the latter she made the meridian distance 2° 16′ W. by dead reckoning.

*The Asia's description of the Aldabra Isles.*

The ship Lord Castlereagh, of Bombay, Capt. Laing, saw these islands, December 15th, 1815. At daylight, thick weather, saw land from the deck, bearing S. by W. to W. by S., distant from the nearest part about 3 leagues: the wind being light and variable from the eastward, bore away to leeward of the land, in case of unknown dangers.

*The Castlereagh's description.*

Steered along the coast for the most projecting part, and passed it at 2 or 3 miles distance, which, after doubling, found the North side of the island to lie nearly East and West.

This land consists of three principal islands, named East, Middle, and West Islands; the two former appeared to be of equal length, and West Island about two-thirds that of the others. East Island appeared to lie in a S.E. and N.W. direction, the East end forming the projecting part mentioned above. Middle and West Islands extend nearly East and West. A reef of breakers projects from the east end of East Island, at least 3 miles in an easterly direction; and the North side of this island appeared to be fronted by several rocks close to the shore with high breakers; otherwise, the sea appeared deep and clear of danger. This island is of moderate height, here and there interspersed with a few trees, and a hummock near the eastern extreme, close to which the beach is fronted with white patches of sand, and there are other white patches, almost hid by the brushwood and verdure that cover this island, and give it a beautiful appearance.

The gap between East and Middle Island is about half a mile wide, with breakers

stretching across, and some isles covered with bushes, extending to the southward as far as could be discerned.

Middle Island is the highest, the East part of it being elevated, and covered with very high trees, for at least a mile in extent, that may be seen 8 or 9 leagues from the deck of a moderate sized ship. The other parts of this island are well covered with verdure, and trees interspersed, with some white patches inland and on the beach, which give it a fine appearance. In coasting along this island, the beach seemed to be steep to, the water not discoloured, therefore did not try for soundings.

The channel between Middle and West Islands appeared perfectly clear, about a quarter of a mile wide, without any indication of breakers or danger, with smooth water inside, where any boat might land, there being no surf whatever, and as far as could be distinguished through the gap, no islands or dangers were visible.

West Island, is of level appearance, and although clothed with verdure, has very few trees or bushes on it of considerable size, like those on the two former islands; but it has, like them, several white patches. The coast of this island is also clear of danger, the N.W. end being fronted by a white beach of at least half a mile in extent, and it may be seen at 6 or 7 leagues distance from the deck of a large ship.

When abreast the central part of the coast of these islands, the beach of the extremities could not be seen from the poop, by which it may be inferred that their northern coast extends about 38 or 40 miles in length; and the north and west sides of them may be approached with safety by night or day.

At noon, the N.W. end of West Island bore S.S.E., distant 6 miles, observed lat. 9° 19′ S., lon. by chronometers 45° 44′ E. And when the Island Comoro was seen on the 17th December, the chronometer placed it in the position given in this work, by which we may infer, that the position of the foregoing islands is pretty well ascertained, their N.W. extremity being in lat. 9° 23′ S., lon. 45° 46′ E.

From the appearance of these islands, water is perhaps plentiful, and also timber of sufficient size to be useful to any ship in distress for spars.*

After the bearings were taken at noon, a squall from eastward with rain, obscured the land till half-past 4 P.M., having run 22 miles per log: it then clearing up, the island was just visible from the deck, bearing E.S.E., distant about 8 leagues.

Capt. Moresby, in August, 1822, passed on the south side of the Aldabra Islands, in the Menai, and made the east point bear nearly N. by W. from Assumption Island, distant 19 miles, or in lat. 9° 24½′ S., lon. 46° 25′ E.; and according to Mons. Hodoul's plan, the extent of the Aldabra Islands East and West is 11 leagues, making the western extremity in lon. 45° 51′ E., nearly agreeing with Capt. Laing's observations.

Natal Island, doubtful.

NATAL ISLAND, is generally placed about a degree to the northward of Aldabra, or in lat. 8° 25′ or 8° 35′ S.: but its existence is doubtful.

Alphonse.

ALPHONSE ISLAND is low, of considerable extent, having on it some small trees or shrubs. The Carmarthen, Capt. Ross, passed it 12th of April, 1811, and found it surrounded with breakers. Capt. Moresby made the North point in lat. 6° 59½′ S., lon. 52° 41′ E. by chronometers, and 52° 45½′ E. by observations of ⊙☾. Variation 7° 55′ W. He rounded this point a quarter of a mile from the reef which

* These islands abound with land turtle, and probably have a good harbour.

extends half a mile from the point. The southern extremity of these dangers Capt. Moresby observes, is fast rising into an island of greater extent than Alphonse; when in lat. 7° 14½′ S. at noon, this isle bore *true* East, and the extent of the reef still farther South, so that between lat. 6° 59½′ S. and 7° 20′ S. dangerous reefs nearly unite North and South Alphonse; there is a passage, but it is very intricate and dangerous, and the currents are strong and uncertain. The above-named officer, in March, 1822, remained two days under sail on the lee side of the island, whilst the people were on shore turning turtle.

The mean of four other ships' observations, by ⊙ ☾ * and chronometers, places this island in lat. 7° 4′ S., lon. 52° 49′ E.

About 4 leagues due South from Alphonse lies a sandy isle or bank already mentioned, called South Alphonse, a little above water, with a reef of high breakers surrounding it, and extending N.E. and S.W. 5 or 6 miles. There are no soundings within a mile of the sand. Captain Owen places the centre of Alphonse in lat. 7° 0½′ S., lon. 52° 48′ E., and adopts the names of Bijoutier and St. Francis for the southern islands of the group. South Alphonse Sand Bank or Isle.

THE SEYCHELLE ARCHIPELAGO is an extensive group of islands, the southern extremity of which is about 15 or 16 leagues to the northward of Alphonse. Seychelle Islands.

The principal islands of this Archipelago were explored in 1743, by Lazarus Picault, and named after Mahé de la Bourdonnais, then governor of Mauritius. These are situated on the middle of a great bank of soundings, Mahé being the largest. The French have usually fed cattle on these islands, and they have colonized those of greatest value with slaves from Madagascar. The following particulars are extracted from the remarks communicated by G. Harrison, Esq. to the late Commander Barrow, of H. M. S. Rose, on his visit to the Seychelles, in March, 1837.*

"The Archipelago of Seychelles consists of more than thirty islands: Mahé, and those in its vicinity are of primitive rock, with high land generally, and are well watered by innumerable small streams.† Several still possess a quantity of good timber, fit for ship building, and for other useful purposes. The more distant islands are composed of sand and coral, and are but a few feet above high-water mark—most of them afford a supply of water, but it is of a brackish taste, and is procured by making excavations in the sand. The trees which grow on them are merely fit for fire-wood. The climate is considered healthy, particularly for children: and although the thermometer generally stands from 82° to 84° throughout the year, the heat in the day is seldom felt to be oppressive in the shade."

"From May to November the S.E. trade wind prevails, at which season, vessels make their passage from hence to Mauritius in about twenty days on an average, and from Mauritius to Seychelles in seven days. During the other months, the winds are variable, principally, however, from S.W. and N.W. At this period, fourteen days is a common run from Mauritius to Mahé. Hurricanes are unknown, but from the beginning of December to the middle of April, the inhabitants do not like sending their vessels to Mauritius. It rains most during the months of October, November, December, and January. The tides rise about 6 feet."

"The only fruits very common, are plantains and pine apples, though many other tropical fruits may occasionally be obtained; but the Seychelles are most famed for the Cocos de Mer. Vegetables are scarce, the pumpkin and sweet potato being the

* See Nautical Magazine for 1839, p. 443.

† This has reference principally to Mahé.

most common. Fish is plentiful, and only one kind poisonous, viz. the sardine or sprat. The hawks-bill turtle are never eaten at Seychelles; they are, however, taken from May to the latter end of October, and are extremely valuable, being the whole source of revenue to many families. The green turtle are common from November to April, and may be purchased for 12 or 14 shillings each. The land tortoise, which is brought from Aldabra, is a favourite article of food, but has become scarce. Beef sells at 4½*d.* per lb.; live pigs 3*d.* per lb.; sheep, which were formerly cheap, are not now to be procured. Fowls generally a shilling each. Turkeys from 6 to 8 shillings each. Supplies for shipping are not abundant, but might become so if vessels frequently touched here."

"Near the town, is a very good ship builder's yard. In the event of a vessel coming here to be repaired, I would recommend her bringing every thing but wood and workmen, the supply of marine stores, at this small place, not being always considerable."

Harbour and road of Mahé.

MAHÉ is about 16 miles long, and 5 broad. On its N. E. side there is a harbour, secured by reefs from all winds; and farther out is the road, sheltered from easterly and S. E. winds by the Island St. Anne and Cerf Island, but exposed to northerly winds. The best approach to the Road is to the northward of St. Anne Island, the north point of which may be rounded close, if necessary, but according to Capt. Owen's survey, the West side of the island is lined with a rocky bank to the distance of nearly a quarter of a mile off shore, which must be avoided. There is good anchorage in 9 or 10 fathoms with St. Anne's Peak bearing E. ½ N., and the west point of Cerf Island S. ¼ E., about half a mile off shore.

A good leading mark for the entrance of the Port is, Beacon Island in one with the south end of St. Anne Island. To the northward of the road, there is a reef,* about 2 miles off the N. E. end of Seychelles, having a safe channel within it, of 18 and 20 fathoms water. St. Anne and the anchorage on the west side of it, is in lat. 4° 35′ S., and that island is in lon. 55° 35′ E., by observations of Abbé Rochon.

Mr. Russel, of H. M. ship Topaze, made the town of Mahé in lon. 55° 31′ E. by lunars, and in 55° 27′ E., measured by three chronometers from Port Louis in a run of 15 days.

Capt. Moresby, of H. M. ship Menai, in 1821 and 1822, made the anchorage at Mahé in lat. 4° 35′ S., lon. 55° 33′ E., by lunar observations agreeing with chronometers. Capt. Owen made St. Anne in lon. 55° 33′ E., or 1° 58½′ West, from Cooper's Island, Port Louis, Mauritius.

Tides.

The flood sets about S. S.W. and rises 6 feet; high water at 3¾ hours on full and change of moon; Variation 7° W. in 1821. The Island of Mahé is high, probably more than 2,000 feet above the sea, rising in most places nearly perpendicularly from it, and was inhabited in 1812 by about 60 families, who cultivated cotton, made coco-nut oil, collected tortoiseshell, and built small vessels, such as brigs and schooners.†

During the hurricane months at the Island of Mauritius, ships of war, in order to avoid these storms, are sometimes ordered to the Seychelles, as the hurricanes do not approach near to the equator.

Capt. Moresby, who explored great part of the Seychelle Archipelago in 1821 and

* According to Captain Owen's Survey, there is no danger near the position assigned to this reef, but the Brisans, hereafter described.

† The Seychelle Islands, since the late war, have belonged to Great Britain.

1822, states, that Mahé abounds with wood, and may be seen 12 or 13 leagues; its eastern side is bordered by extensive reefs of coral, the openings of which opposite to St. Anne Island form the Port, which is capable of holding five or six large ships of war moored, with sufficient room for small vessels. The anchorage between the coral reefs and St. Anne is excellent, with the centre of St. Anne bearing East three quarters of a mile, the town of Mahé W.S.W. in 8 to 15 fathoms, sandy bottom. There are several coral patches between St. Anne and the entrance of the port, having less than 4 fathoms on some parts, which must be avoided by large ships. In the S.E. monsoon the wind never blows hard, and seldom strong. In the N.W. monsoon heavy gusts blow from the land, in which the wind varies: in this season, ships might conveniently lie between St. Anne and Ile Moyenne; there is a good passage between these islands. A large ship has been known to come to the road of St. Anne between Ile Cerf and the main, but the passage is very intricate and dangerous. · During the S.E. monsoon, there is good anchorage on the western side of Mahé, but heavy gusts come over the high land, when the winds are moderate and steady on the eastern side. Water and wood may be procured either at St. Anne or Mahé: a large boat, loaded, cannot pass over the coral reefs when the tide is low. A supply of about 150 cattle could be obtained, also a large quantity of rice, and refreshments for the sick, excepting wine, in abundance, and at a moderate price. Captain Moresby's remarks.

Mahé is without fortifications, but easy to defend from its precipitous hills and deep ravines; nor could ships approach sufficiently near the town to fire effectually, without entering the port, which is narrow and intricate.

PRASLIN is a high island, N.E. 20 miles from Mahé, next to it in magnitude, and about equal in height. The anchorage is in a bay on the north side of the island, between the island of Curieuse and the main, having a depth of water from 5 to 12 fathoms. It is safe, and well protected from northerly winds by Curieuse Island, and it is sheltered also to the eastward by the neighbouring islets. Praslin (West Point) is in lat. 4° 17′ S., about lon. 55° 44′ E., and the watering place is on the adjacent Island Curieuse: the tide rises 6 or 7 feet. On the hills, the trees are generally hard wood, and coco-nut trees are plentiful in many of the valleys. Thirty families inhabited Praslin in 1821, who prepared coco-nut oil, and cultivated cotton, by numerous slaves. Anchorage at Praslin, &c.

The dangers between Mahé and Praslin are as follows, from Capt. Moresby's Observations. Northward of the anchorage of St. Anne, about 4 miles, the Brisans are situated, two rocks, which bear from each other S. E. $\frac{1}{2}$ E. and N.W. $\frac{1}{2}$ W. From the North Brisan, N. by W. $\frac{3}{4}$ of a mile, there is a small coral patch with 6 fathoms water on it. Between the Brisans and the Mamelles, the bottom is uneven, having from 7 to 13 and 15 fathoms at one cast. A musket shot W.N.W. of the Mamelles there is a rock with 6 feet on it, on which the sea generally breaks; but when the weather is fine it is difficult to be seen: two ships' lengths from the North point of the Mamelles, lies a sunken rock. Half-way between the Mamelles and Praslin are two dangerous rocks, called in Capt. Owen's Survey, Madge Rocks, covered in high tides, distant from each other between two and three cables' lengths N.E. and S.W.: in the S.E. monsoon, the sea usually breaks high, but when Capt. Moresby passed them within two cables' lengths, the southernmost appeared now and then above water, and the position of the northernmost was only indicated by the reflux of the water. The marks for these rocks are, the highest part of St. Anne on with the Dangers between Mahé and Praslin.

Mamelles; South part of Digue Island bearing East; Silhouette Island W. $\frac{3}{4}$ S. From these rocks E. by N. $\frac{1}{4}$ N., there is a bed of rocks called Trompeuse, from its being often mistaken for those last mentioned. N.E. of Trompeuse, mid-way between it and the N.W. point of Praslin Island, are two islands, called the Cousins; between the South Cousin and Trompeuse, the channel is intersected with dangers, which a ship cannot pass with safety; but between the Cousins there is a safe channel, likewise between the North Cousin and the reef that extends from Praslin. From the North Cousin N.W. 4 or 5 miles, lies a small dangerous rock called the Baleine, covered at high water. Capt. Moresby observes, that he searched for this rock but could not find it, not having any decisive marks; it is, however, frequently seen, even with the water's edge at half tide. From the North Cousin W.N.W. distant $1\frac{1}{2}$ miles, lies a coral patch, having $2\frac{1}{2}$, 3 and 4 fathoms, between which and the Baleine Capt. Moresby passed, steering for Booby Island (Ile aux Fous) leaving on the starboard hand a coral patch with 4 fathoms on it, about half-way between Booby Island and the N.W. part of Praslin. Having Booby Island and Ile Aride in one bearing N. $\frac{3}{4}$ W. and S. $\frac{3}{4}$ E. of each other, Ile Marianne being just open of Ile Curieuse, you may haul up with safety to anchor, or pass between Curieuse and Praslin.

To the N.W. of the Mamelles, distant $1\frac{1}{2}$ miles, there are several rocks. About $1\frac{1}{2}$ miles east of the rocks called the Chimnies, between the Isles of Mahé and Praslin, there are several rocks at the water's edge, on which the French frigate Regenerre was nearly lost; and to the N.E. of the Chimnies about $1\frac{1}{2}$ miles distant, lie several rocks under water.

Silhouette.

SILHOUETTE, (centre) in lat. 4° 29′ S., lon. 55° 17′ E., is the highest of the Seychelle Islands, the next to Praslin in magnitude, and nearly circular. It is situated to the north-westward of Mahé, distant 3 or 4 leagues: it abounds with timber, and has five families residing on it; the landing is difficult, from the surf which beats over the coral reefs. Most of the other islands in this archipelago are small, some of them very low, with extensive reefs about them.

Bank of soundings and islands on it.

The bank of soundings on which these three islands, and the adjacent small ones are situated is in length N.W. and S.E. about 54 leagues, being of a triangular form, with the acute angle to the S.E. The most easterly islands on the bank, are Frigate Isle, about 6 or 7 leagues south-eastward from Praslin, and the Three Sisters, Felicite, and Marianne Islands, 5 or 6 miles to the eastward of it.

Captain Moresby thus describes the smaller islands on the Seychelle Banks:—

Curieuse, the Sisters, &c.

CURIEUSE is a small island of moderate elevation, to the North of Praslin; the channel between them is from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles wide, affording excellent anchorage at all seasons of the year. A coral patch with 4 fathoms on it, is distant 1 mile from the S.E. end of Curieuse, and a detached rock bears N.W. from its N.E. end.

Between Praslin and the Sisters, (Les Sœurs) the bottom is generally uneven from 6 to 25 fathoms, but there are safe channels between The Sisters and Ile Felicite: a bed of rocks extends from The Sisters southward, chiefly above water. Ile Ave Marie is a rock about half-way between Praslin and Felicite, having a shoal projecting S.W. from it about a cable's length.—There is a shoal spot about 2 miles N.W. of the Western Sister, and another 5 miles North of the same island—both given in the charts on the authority of M. Vailheu.

DIGUE ISLAND is inhabited; it is surrounded by a reef, and the landing is difficult: between it and Praslin, in mid-channel, lie two dangerous rocks, covered at half-tide, distant nearly a mile from each other, in a S.S.E. and N.N.W. direction. Around the southernmost rock, at a boat's length from it, Captain Moresby had 6 fathoms, and 9 and 12 fathoms at a ship's length: but he thinks a ship ought not to pass between these rocks till the space between them is better known. Digue Island and adjacent dangers.

From the Round Island, united by a coral reef to the East end of Praslin, distant 2 or 3 miles S.S.W., are two rocks above water, called the Reguins, bearing from each other about N.N.E. and S.S.W., distant two or three cables' lengths; the south point of Digue Island on with the south point of Mariane will lead to them. From Digue Island, five miles South, a little easterly, lies a bed of rocks, called the Chimnies, and W.N.W. of these, one mile, there is a dangerous rock covered at half-tide.

FRIGATE ISLE, or ILE AUX FREGATES, in lat. 4° 32′ S., lon. 56° 0′ E. (lat. 4° 35′ S., lon. 56° 1′ E. by Capt. Owen), is the easternmost of the Seychelle group, elevated 550 feet above the sea, about 2½ miles in length, having a rocky reef off its S.W. end, over which the sea breaks. This island is inhabited, and has anchorage under its lee: ships running for St. Ann Roads in hazy weather will pass it before they see Mahé, and sometimes they may be as far as Ile Recif before Mahé is seen. Frigate Isle.

ILE RECIF, in lat. 4° 34′ S., lon. 55° 49′ E., elevated about 150 feet, and 1½ miles in length, has a remarkable rock, like a building, on its summit, the resort of millions of birds, which make it appear white. With this rock bearing S.S.E. 1½ miles, the Menai anchored in 17 fathoms sand and shells. Ile Recif.

DENIS, or ORIXA, the north-easternmost island of the Archipelago, is in lat. 3° 49′ S., lon. 55° 44′ E. by the observations of Captain Tanner of the Bombay Marine, who passed close to it 28th July, 1821, in the Company's cruizer Antelope, and describes it as follows. This island is about 2½ or 3 miles in extent North and South, with several thatched habitations on its northern side; it is very low, covered with trees, and may be seen from a ship's deck about 4 leagues. A reef appeared to project from its southern end nearly a mile, with discoloured water beyond it; and a coral bank or spit extends from it to the northward and westward nearly 3 miles, upon which we shoaled suddenly, and found 7, 6, and 5 fathoms, and there may be less water on some of the patches. In approaching from S.E. the soundings at 3 and 4 leagues distance are from 25 to 30 fathoms, sand, coral, and shells; and when the island bears from S.W. to South, you are off the spit that stretches out from its northern extreme. If you suddenly shoal under 10 fathoms in passing, immediately haul out to the northward or north-eastward. From 10 fathoms the soundings gradually deepen as you stand to the N.W., and the bank slopes down to 40 fathoms when the island disappears from the deck. As this island is near the north-eastern extremity of the great bank of soundings which circumscribes the Seychelle Archipelago, it is convenient for a ship to make, when proceeding by the southern passage for the Arabian Gulf, there being no danger in steering towards it in the night, if the lead is kept going, which will give timely warning of your approach to it in any direction. Denis Island.

Bird Island. BIRD, or SEA COW ISLAND, the northernmost of these islands, in lat. 3° 43′ S., lon. 55° 16′ E., is a small, low sandy isle, with a few shrubs on it, and surrounded by a reef, about $1\frac{1}{4}$ miles in length. There is anchorage off it in moderate depths, the bottom rocky, mixed with sand. When this island was explored by the Eagle cruizer from Bombay, in 1771, many sea lions, probably Manutees or large seals, were seen on the beach, with birds innumerable. A bank extends from the South end, having 9 fathoms sand and coral at 6 miles distance from the island. L'Hirondelle, French privateer, with 180 people on board, was lost on it, having sailed the preceding day from Mahé, to cruize in the Red Sea. They procured water by sinking a pit in the sand, remained there 22 days, and part of them got to Mahé on a raft.

French Shoal. FRENCH SHOAL, on which a French ship is said to have been lost, was twice passed over in 1824, by Capt. M'Lean, of the Swan southern whaler, belonging to Messrs. Enderby, who describes it to be a dangerous shoal, about 5 or 6 miles in extent, with depths of 9, 5, and 3 fathoms, the least water found on it, over a bottom of coral rock. This shoal was found to be in about lat. 3° 55′ to 4° 1′ S., lon. 54° 42′ E., 10 or 12 leagues to the westward of the meridian of Bird Island, and it is a little within the verge of soundings on the great bank that surrounds the Seychelle Islands. On the Admiralty Chart this Shoal is placed in lat. 4° 0′ S., lon. 54° 32′ E., and there is also another shoal spot near the edge of the bank, given on the authority of M. Dupont, with $3\frac{1}{2}$ fathoms on it, in lat. 4° 15′ S., lon. 54° 23′ E.

On the extensive bank which surrounds the Seychelle Islands, the depths are generally from 14 to 40, or 45 fathoms, but there is less water on some parts of it, particularly at the eastern and western extremities. About 6 or 7 leagues East, and E.S.E. from Frigate Island, the soundings are from 8, to 10 or 12 fathoms coral, on an extensive part of the bank. The Mary had 10 and 11 fathoms on the south-eastern part, and West from the Island of Mahé 18 leagues, she had 11 fathoms rocky bottom. There are some shoal patches on the western edge of the bank as already described.

Shoal. The brig Zoroaster is said to have passed over a coral bank in lat. 5° S., lon. 56° 40′ E., the least water 7 fathoms, but there was apparently less water on some of the coral patches at a small distance.

Amirante Islands. The south-western group of the Seychelles, called the AMIRANTE ISLANDS, consists of several detached small islands, coral reefs, and banks. The Amirantes differ little from each other, being generally from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles in length, situated on coral banks, and seldom exceeding 20 or 25 feet in height; but they are crowned with trees, rising 24 or 25 feet above the land, and coco-nut trees, cultivated by slaves from Mahé, will soon be abundant. By digging 12 or 14 feet, water may generally be obtained. Calms, and uncertain currents, with the want of good anchorage, make it desirable not to approach these islands in large ships, unless obliged by necessity.

Eagle Island. EAGLE ISLAND was examined in 1771, by the Eagle cruizer, and is a low sandy island, about $1\frac{1}{2}$ or 2 miles round, covered with shrubs, and encompassed by a chain of reefs to the northward and eastward, at the distance of 2 and 3 miles from the shore, on which the sea breaks very high. Between these reefs and the island there is a channel, with soundings in it from 9 to 14 fathoms. This island, called by

the French, Remire, is in lat. 5° 8′ S., lon. 53° 22½′ E.; there is no fresh water on it. The tide rises about 9 feet, high water at 3½ hours, on full and change of the moon. Lieut. Russell, R. N., who observed on this island in 1820, gives the lon. 53° 21′ S.—the high water at 5h. 40m. with a rise of 6 feet, and the Variation 7° 30′ W. Tides.

AFRICAN ISLANDS,* two in number, are very small and low, about 6 leagues northward of the bank which surrounds the Amirante Islands, and were discovered about 1795, by some of the small French vessels which belong to, and navigate in these parts. Captain Adams, of H. M. S. Sybille, examined them in 1801, and found a few shrubs on them. They are almost overflowed at high spring tides, and abound with turtle and aquatic birds, but are destitute of fresh water. African Islands.

The largest island is the southernmost, joined to the other by a sand bank, which is dry at low water, spring tides; their length from North to South is not above two miles. On the east side of them is a reef of breakers, and on the west side there is safe and commodious anchorage in a bay, formed by the extremes of the isles and the reef which joins them. Observations taken on the southern island made it in lat. 4° 55′ S., lon. 54° 9½′ E., by stars on each side of the moon. But Lieutenant Hay, of the Menai, in 1821, observed on the North island, and made it in lat. 4° 50½′ S., lon. 53° 27½′ E., allowing Eagle Island to be in lon. 53° 22½′ E.; so that the position of these islands, and of others on the southern part of the bank, seem all to have been placed too far to the eastward by former navigators.† Variation 8° W. in 1821. The tides rise about 8 feet, high water at 9 hours 39 minutes, on full and change of moon. These islands lie about 6 leagues to the northward of Remire, or Eagle Island; and 4 miles N.W. by N. from the latter there is said to be a reef; also, a bank extends 4 or 5 miles from the south end of the African Islands, with 5 to 9 fathoms on it; but there is a safe channel between them and the others which lie to the southward. The Mary passed through this channel 17th December, 1694, and afterwards steered to the eastward, between the Seychelle Islands and the small isles on the south part of the bank, without perceiving any danger. Position. Tides.

ILE DE NEUF (Isle Nine), in lat. 6° 13¼′ S., is the southernmost of the Amirante Islands, very small, and covered with bushes. MARIE LOUISE ISLAND, 7 miles E. N. E. from Ile de Neuf, is also woody and small, surrounded by a reef, on which there is a quarter less 4 fathoms, 2 miles West from the island. Captain Moresby passed in the Menai, between these islands, in soundings of 12, 15, and 17 fathoms, and continued the latter depth steering N. E. 3 miles. Ile de Neuf, and Marie Louise.

ILE BOUDEUSE, in lat. 6° 11′ S., lon. 52° 55′ E., is on the western extremity of the Amirante Bank, and, like the two islands last described, is small, crowned with wood; they are all surrounded by coral reefs, excepting a few narrow openings. Ships should use a chain if they anchor among these islands; the white sandy bottom may be distinguished by the coral patches, when in 12 to 15 fathoms water. Ile Boudeuse.

* His Majesty's schooner Spitfire was wrecked on the reef at the southern part of these islands, 21st August, 1801. Lieutenant Campbell, the commander, with four men, left the Isles in a small boat on the 27th, saw Silhouette 29th, reached it the 31st, and got a supply of water and coco-nuts; he then left this island, and reached Mahé Roads, 2nd September, where he found the Sybille frigate, Captain Adams, who proceeded immediately to the African Islands for the remainder of the Spitfire's crew.

† Capt. Owen places the North Island in lat. 4° 53½′ S., lon. 53° 33′ E.

Ile L'Etoile.

ILE L'ETOILE (Star Island), in lat. 5° 57′ S., and bearing N. $\frac{1}{4}$ E. from Marie Louise, is about $1\frac{1}{2}$ miles in length, low, and covered with bushes; the surrounding reef projects to the southward about a mile, and to the N.N.W. of the Isle there is a bank with breakers on it.

Iles Poivre.

ILES POIVRE, in lat. 5° 43′ S., lon. 53° 20′ E., are two small islands within a mile of each other in an East and West direction, bearing N. by E. $\frac{3}{4}$ E. from Ile Marie Louise. Reefs extend around them to a considerable distance, and 7 or 8 miles to the northward there is a bank dry at low water.

Ile de Roches.

ILE DE ROCHES, in lat. 5° 41′ S., lon. 53° 42′ E., or 22 miles East of Poivre, has a bank extending around it about 4 leagues to the North or N.W., and 2 leagues to the East, with only $2\frac{1}{2}$ fathoms on it in this part, and mostly from 5 to 13 fathoms to the north-westward; but in a southerly direction, the bank extends only a small distance from the Isle.

Ile St. Joseph.

ILE ST. JOSEPH, in lat. 5° 27′ S., and 4 or 5 miles East of Ile de Ros, according to the observations of Mr. Russell, of H. M. S. Topaze, who explored most of these islands in a small vessel, while the frigate lay at Mahé during the Mauritius hurricane months; and the descriptions and positions here given of the Amirante Islands, and most of the others of this archipelago, are from the late observations of Mr. Russell, or Captain Moresby, which correspond with each other, but differ much from the positions assigned to them by the French.

Ile de Ros.

ILE DE ROS, in lat. 5° 24′ S., is nearly on the meridian of Eagle Island, by Mr. Russell's observations. To the northward of it about 3 miles, is the southern extremity of a shoal bank, marked with 2 fathoms in that part, from thence stretching nearly to Eagle Island, with soundings of 4 to 9 fathoms. When Ile de Ros bore S.E. 12 miles, Lieutenant Hay found $4\frac{1}{2}$ fathoms rocky bottom, then steered N. by W. 3 miles, and was off the bank. Sand banks and coral reefs extend far West of St. Joseph, making the channel between that island and Ile de Ros narrow and dangerous.

Ile Platte.

ILE PLATTE is in lat. 5° $48\frac{1}{2}$′ S., lon. 55° 27′ E., by Captain Moresby's chronometers and observations, of 30th March, 1822; he left Mahé on the preceding day, and in passing 3 miles to the eastward of it, had no bottom with 100 fathoms; but off its S.W. end a bank extends 4 or 5 leagues, having from 5 to 12 fathoms, sand and coral. From the north part of the island, a reef extends W.N.W. 4 or 5 miles, and also 1 mile E.S.E. from the north point. This island is composed of coral, and is about a mile in length. Mr. Russell places this island in lat. 5° $50\frac{1}{2}$′ S., lon. 55° 20′ E.

Cœtivy Island.

CŒTIVY ISLAND, discovered July 3d, 1771, by the Chevalier De Cœtivy, is low and sandy, extending about S.W. by S. and N.E. by N. 8 miles, having off the North and N.W. points, in the S.E. monsoon, anchorage on a bank of sand stretching half a mile from the shore, in 7 to 17 fathoms. Captain Moresby touched here in H.M.S. Menai, in April, 1822, and found abundance of turtle; water may be procured close to the anchorage. The reef extends far to the southward. By Capt. Moresby's observations and chronometers, the north end of the island is in lat. 7° 6′ S., lon. 56° $16\frac{1}{2}$′ E. Capt. Owen makes the centre in lat. 7° 9′ S., lon. 56° $18\frac{1}{2}$′ E.

The Lord Eldon and Carmarthen, 10th October, 1808, made the island, probably the south end, in lat. 7° 19′ S., lon. 56° 20′ E.; and the Sir Stephen Lushington, in 1811, made it in lat. 7° 14′ S., lon. 56° 32′ E., by chronometers. Variation 9° 2′ W. in 1822. Captain Malfie carried on a manufactory of coco-nut oil here in 1811.

ADELAIDE BANK, very little known, is thought to be situated about 15 leagues N.E. from the above island; and in lat. 6° 9′ S., N.N.W. 6 or 7 leagues from Adelaide Bank, SUCCESS BANK, is said to be in lon. 56° 40′ E. Captain Moresby thinks these banks unite on the meridian of 56° 35′ E., between lat. 5° 10′ and 5° 40′ S., and that they are a continuation of the Grand Mahé Bank. Adelaide and Success Banks.

FORTUNE BANK, named by Kerguelen, after his vessel, in which he left Mauritius, 13th September, 1771, made a North course corrected from thence, and at 1 A.M., 19th, had ground with 30 fathoms, next cast only 19 fathoms, rocky. He stood on the other tack under a foresail, until the anchor was ready, and shoaled to 17, 15, and 14 fathoms sand, then anchored, being apprehensive of driving upon some *sand bank*. The multitude of sharks about them made the sea luminous like breakers; of these they caught above 50, and a great quantity of crabs, with which the sea was covered. When day-light appeared, no danger was discernible. On weighing, he let the vessel drive, and continued sounding; for a long time they had 14 fathoms, then 20, 25, and 28; and at once no ground. Kerguelen states it to be in lat. 7° 16′ S., lying N.W. and S.E., but does not mention its extent; according to M. D'Apres, it is 3 leagues. Fortune Bank.

This bank was discovered 31st May, 1770, by the Verelst, Captain Compton; who observed on the 30th in lat. 7° 24′ S., and thought they were then on the bank, but did not sound till about 3 quarters before 1 P.M., when he had 15 fathoms coral rock, then 14 fathoms several casts. The weather was fine and clear, with a smooth sea, could see no appearance of shoal water or breakers from the mast-head. Steered N.E. ½ E., going about 4 knots, and had shoaled to 12 fathoms by 1¼ P.M.; continued that depth till 2 P.M., then deepened to 14 fathoms a few casts, and shoaled again to 12 fathoms. From 2½ to 3 P.M. had 11 fathoms very regular, from 3 to 3½ P.M. had 10½ fathoms very regular, then as fast as the line could be passed along, no ground at 20, 50, and 100 fathoms. Though the N.E. edge be steep, it is supposed the S.W. part shoals gradually, as some of the people had observed the water discoloured, as early as 10 A.M. the preceding day. They found the N.E. end of the bank to be in lat. 7° 11′ S. Immediately after losing soundings, the sea regained its proper colour, with the usual swell. Numbers of ground sharks were seen during the time they were on the bank. Captain Compton's description of the bank.

The Surat Castle, on her passage from Mauritius to Madras, crossed over this bank 22nd February, 1789. The first cast of the lead was 15 fathoms irregular, and in running over the bank from 15 to 10 fathoms, the least water, coral rocks and coloured shells. An appearance of breakers was seen on the western edge with strong ripplings round it. By lunar observations taken in this ship, the bank was found to be in lon. 57° 38′ E. The Surat Castle's passage over the bank.

The Sir Stephen Lushington, in January, 1811, after passing the Island Cœtivy, next day got upon Fortune Bank, and carried soundings of 10 to 12 fathoms, steering East 7 miles; coral rock and sand were plainly visible under the ship, and as far as could be seen from the mast-head to the northward and southward. At noon had 38 fathoms, and soon after no ground; by observations taken on the bank, it was found The Sir Stephen Lushington's passage over the bank.

to be in lat. 7° 7′ S., lon. 57° 4′ E., or 31 miles East of the Island Cœtivy by chronometers. This would place it in lon. 56° 47½′ E., by adopting Captain Moresby's longitude of Cœtivy. The Company's ship Abercrombie Robinson, Captain J. Innes, April 12th, 1830, carried regular soundings from 10 fathoms, the least depth, to 17 fathoms water, steering N. by E. about 5 or 6 miles over the N.W. edge of the bank, *supposed*, which part was found to be in lat. 7° 6′ S., lon. 56° 31′ E. by lunar observations, and in 56° 49½′ E. by mean of chronometers.

The Abercrombie Robinson's passage over the bank.

About 45 leagues north-north-eastward from Fortune Bank, in about lat. 5° 12′ S., there is another bank according to the French, with soundings on it from 13 to 31 fathoms.

Roquepez.

ROQUEPEZ, a low sandy island, is thought to lie in lat. 6° 24′ S., about lon. 60° E.; but if it exist, is probably the Sandy Isle, with breakers extending about 3 miles from it, said to have been seen in the Bridgewater at 10 A.M., the 6th December, 1812, then distant 6 or 7 miles, and situated in lat. 6° 27′ S., lon. 60° 4′ E. (its southern extremity), may perhaps be the *doubtful* Island Roquepez.

Swift Bank.

SWIFT BANK, from the journal of the vessel of this name, who passed over it going from Mauritius to Ceylon, in 1744, Mr. Dalrymple places from lat. 5° 17′ to 4° 35′ S., lon. 61° 5′ to 61° 30′ E. The soundings found on it were from 18 to 35 fathoms.

Rose Galley Rocks.

ROSE GALLEY ROCKS, said to be a ledge of rocks and breakers, seen by Captain Gentleman, in the Rose Galley, going from Madras to Bombay in 1746; since which time, they appear never to have been seen, rendering their existence doubtful. This danger is said to be in lat. 5° 30′ S., and thought to be nearly on the meridian of the N.E. end of Swift Bank, or about 61° 33′ E. The run from Madras places the Rose Galley Rocks in about lon. 61° 52′ E.

Passage between the Seychelles and Chagos Archipelago.

This danger, said to have been seen in the Rose Galley, is thought to be the most easterly of those in the vicinity of the Mahé Archipelago, between which and the western limit of the Chagos Archipelago there is a space of above 8° in longitude, considered free from shoals or islands, which is frequented by ships from the Eastern parts of India going the Southern Passage to Bombay, and was formerly used by ships in early times, proceeding from Bombay to England. This route is now seldom frequented by homeward-bound ships, although it appears eligible when the northerly and N.W. winds may be expected between the equator and Mauritius, in December and January.

The London's passage.

In 1796, the London proceeded by this passage. January 29th, she was in lat. 3° N., lon. 67½° E., got the winds then at West and S. Westward, afterwards at N.W. until in lat. 1° S., lon. 68° E., on the 2nd February. From hence, brisk winds, between W.S.W. and W.N.W., continued till in lat. 12° S., lon. 75° E., on the 7th; then veered to North, where they kept till she reached lat. 21° S., lon. 75° E., on the 10th; had then light N.W. winds one day, and got the trade at S.S.E. on the 12th in lat. 22° S. In 23° S. it veered to E.S.E. In 24½° S., lon. 62° E., had strong N.N.W. gales two days, then S.W. and southerly winds three days more. On the 21st February, in lat. 25½° S., lon. 59° E., had a return of south-easterly winds.

# CHAGOS ARCHIPELAGO.

## Principally from the Nautical Directions of Captain R. Moresby, of the Indian Navy.

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THE CHAGOS ISLANDS AND BANKS were very imperfectly known, until Captain Archibald Blair, then a Lieutenant of the Bombay Marine, surveyed them in 1786. They formerly had the general name of Basses de Chagos, from the largest island which forms the southern limit of the whole, called Chagos Island, or Diego Garcia. These were formerly placed on the charts as separate islands, and Diego Garcia generally laid down about 2½° to the westward of Chagos, but it is now well ascertained, that they are one and the same island.* Chagos Archipelago.

This group was minutely surveyed by Captain Moresby, of the Indian Navy, in 1837, in H. C. Surveying ship *Benares*, accompanied by H. C. schooner *Royal Tiger*, according to whose survey the Chagos Islands and Banks extend from the south part of Centurion Bank, in lat. 7° 39′ S., to the north end of Speaker's Bank, in lat. 4° 44′ S., between the meridians of 70° 50′ and 72° 50′ E. longitude.

"The liberal means placed at my disposal," observes Captain Moresby, "enabled us to go over a great deal of ground, and to ascertain the limits of the great bank occupying the whole space between the outer islands, which bank I have named the Great Chagos Bank, the outer edge of which is dangerous for ships, having, in some parts only 4 fathoms, and seldom more than 6 or 7. When over the edge the soundings suddenly deepen to 30 and 45 fathoms, with here and there patches of 8 and 6 fathoms. As a caution to navigators, I would advise them not to pass over this bank, except in a case of necessity, and then only in the day-time. Should a ship, in the vicinity of these islands, be in want of stock, water, and wood, it can easily be procured, without passing over or near this bank, by visiting either Peros Banhos or Diego Garcia, both of which lie without the bank, and afford every facility for vessels touching there. Pigs and poultry may be obtained in abundance, either from the overseers or the negro apprentices belonging to the establishments."

DIEGO GARCIA, or GREAT CHAGOS ISLAND, extends from lat. 7° 13½′ S., to 7° 26½′ S., and its centre is in lon. 72° 30′ E.; its length from North to South being about 14 or 15 miles, and the general breadth from 3 to 4 miles, having the form of a crescent, with the convex side to the eastward. This remarkable island may be considered as a steep coral wall standing in the ocean, for the whole interior of the island is a lagoon or natural harbour, nearly of the same length and breadth as the island itself, as there is no part of the circumjacent wall above half a mile broad, and the greater part of the eastern side is only about one tenth of a mile in breadth. This island, or rather contour of an island, is low, generally 8 or 10 feet above the sea at high tides, but inundations of the sea appear to have pervaded the Diego Garcia.

* Ady and Candy, and the London Bank, have no real existence.

wall in some places, and imparted their waters to those in the harbour. Although low, the island is covered with tall coco-trees, which make it visible 5 or 6 leagues at sea. A steep coral reef fronts the sea all round, on which it breaks very high, and renders the landing on the exterior impracticable. This reef is steep to, in most places, there being no anchorage for a ship on the outside of the island, except in the entrance of the harbour at the N.W. end. The points which form the entrance are called by Captain Blair, the East and West points; between them are three islands, called East, Middle, and West Islands, the last mentioned lying near the West point of the main island, and the two former nearest the East point.

*Entrance of the harbour of Diego Garcia.*

West Point and Island are joined by a reef dry at low water, and Middle and East Islands are situated on the edge of an extensive coral bank, which projects from them about 2 miles to the southward into the harbour; several parts of it are dry at low water, with dangerous patches of $1\frac{1}{2}$ and 2 fathoms coral in other places. The same coral bank extends to the East point, which renders the passage between it and either of these islands unsafe, except for very small vessels. It appears, however, that M. la Fontaine went into the harbour in 1770, betwixt East Island and East Point, where $4\frac{1}{2}$ fathoms is marked on his plan of the Island Diego Garcia; but Captain Blair, in 1786, found only 2 and $2\frac{1}{4}$ fathoms in the same place; and the ship Hampshire, of Bombay, was wrecked, about 1793, in attempting to enter by this dangerous and shoal passage.

The only safe channel into the harbour is between West Island and the sand projecting from Middle Island above half a mile to the S.W., leaving a channel, near a mile wide, between it and West Island, which is safe to approach on the N.W. and N.E. sides. There are no soundings until a ship is close to the entrance, the water then shoals suddenly, from 100 fathoms, no ground, to 20, 10, and 7 fathoms.

The French used to keep a small settlement on this island, consisting of slaves and a few Europeans, who prepared coco-nut oil and salt fish, for small vessels which came annually from Mauritius.

*Supplies and productions.*

A variety of fish abound in the harbour, and excellent green turtle visit the shores on the outside of the island; the land crabs, which feed on the coco-nuts as they fall from the trees, are also wholesome food; and good fresh water may be had in almost every part of the island, by digging eight or ten feet deep.

*Periodical winds and currents.*

The S.E. winds prevail here from April to November, but are strongest in June, July, August, and part of September, during which time the current generally sets between West and N.W., from 12 to 20 miles daily. In March and April the winds are often very variable and light; October and November are also changeable months, but more unsettled and more squally than the former. In December and January, the N.W. winds prevail almost constantly, producing a current to the S. Eastward.

*Instructions for sailing towards the Island.*

A ship proceeding by the southern passage for Bombay, and desirous of getting a sight of Diego Garcia, should keep in about lat. 7° 30′ to 7° 35′ S., when approaching its meridian, and pass to the southward of the island if the wind is favourable. If she intend to stop for a supply of water, or other refreshments requisite for a scorbutic crew, she ought to steer for the N.E. part of the island, keeping in the parallel of 7° 18′ S. When the S.E. winds blow strong, with hard squalls, much rain, and cloudy weather in July, August, and part of September, she must guard against the currents setting generally to the north-westward, as she might be carried to the northward of the island, if observations were not obtained.

The shore being free from projecting shoals, she may, in the day, run for it without danger, if the weather be not so thick, as to prevent land from being seen at the dis-

tance of 2 or 3 miles. The island being low, and sometimes enveloped by a cloud in the night, great caution is requisite in running for it at such times; nor should it be approached in a dark night.*

To approach Diego Garcia with the S.E. monsoon.

Running for it in a clear night, or in the day with thick weather, when near its position, a ship should be kept under such sail as she can bear on a wind; and if the island is seen, her head ought immediately to be laid to the N. Eastward off shore, if it is night; and it may be prudent to ply to windward till morning, to prevent being carried to leeward by the current. In the day, she should steer along by the N.E. point boldly, passing close on the north side of East and Middle Islands, and round the spit that extends near a mile to the westward of the latter, as close as consistent with safety, to enable her to fetch higher up the harbour. In clear weather, the dangers are always visible from the mast-head; an officer stationed there to look out is the safest guide. Care must be taken, in working up, not to stand farther westward than to bring West Island North, that the shoals in the bight to the southward of this island may be avoided; nor too much to the eastward, that the extensive bank and shoals to the southward of Middle Island may also be avoided.

To enter the harbour.

Entering the channel during S.E. winds, it is proper to keep near to the sand projecting from Middle Island to the westward, which has $5\frac{1}{2}$ and 6 fathoms close to its western point: by keeping this close a-board, a ship may fetch into good anchorage ground without tacking, with West Island bearing N. $\frac{1}{2}$ W.; but attention is requisite, not to stand to the westward of the meridian of this island, on account of the shoal in the bight.

Anchorage.

This part of the harbour, to the southward of the entrance, is the safest when the N.Westers blow, and equally secure with any other part in the south-easters. Its vicinity to the sea, and the facility with which ships may be brought in or carried out, make it preferable to any other part of this capacious harbour; and if necessary, ships may be warped between the shoal patches, within 500 yards of the shore.

The anchorage at this part is generally sandy clay, with bits of coral in some places, and there is good water found in digging on this N.W. part of the island, abreast the anchorage.

Water.

In the channels between the coral banks, which are interspersed through the harbour of Diego Garcia, the bottom is generally fine white sand, mixed in many places with coral, which makes it prudent to anchor with a chain, or to have good ground service on the cables. About half-way up the harbour it is contracted by a large flat projecting from the western shore, and several coral patches in the channel make it in this part intricate for large ships, should they be inclined to proceed so high up. To the southward of this intricate channel, on the east side of the harbour, there is good anchorage beyond the point that projects from the eastern shore.

Harbour channels.

In the upper part of the harbour, the depths are from 5 to 10 and 11 fathoms, and between the entrance and middle part of it, from 7 or 8, to 16 or 18 fathoms, except

* The Atlas was wrecked on the S. E. side of the island, about half an hour before daylight, May 30th, 1786, in which vessel I was at the time. The Charts on board were very erroneous in the delineation of the Chagos Islands and Banks; and the commander, trusting too much to dead reckoning, was steering with confidence to make Ady or Candy (which do not exist) for a new departure, being in their longitude nearly by account, and bound to Ceylon; but, unfortunately, a cloud over Diego Garcia prevented the helmsman from discerning it (the officer of the watch being asleep) till we were on the reefs close to the shore; the masts, rudder, and every thing above deck, went with the first surge; the second lifted the vessel over the outer rocks, and threw her in toward the beach, it being high water, and the vessel in ballast; otherwise she must have been dashed in pieces by two or three surfs on the outer part of the reef, and every person on board have perished. We had been set 4° to the westward of account, in the passage from Bencoolen of 20 days.

near the shores, or on the coral patches or flats; the depths on these are from 1 to 3 fathoms.

If a ship is obliged to anchor at the entrance of the harbour, on the outside, it should be with the channel open, for the wind has been known at times in the S.E. monsoon, to veer to the N.W., and blow from this quarter, a short time in squalls.

Capt. Moresby's directions for Diego Garcia. Tides.

The following directions for the harbour are from Captain Moresby:—

"The tides rise and fall from 5 to 6½ feet, running into the harbour S.S.E., and out of it N.N.W. It is high water at 1h. 30m. full and change; the spring tides in the entrance of the channel run about 2 knots, and unless a vessel has a fair wind or a good slant, she would find it impossible to work into the anchorage against the tide. During the S.E. trade, which blows directly out of the harbour, it is advisable to make the island from the eastward, and so time her arrival off the entrance of the channel, as to have the tide in her favour to enter, when she can easily work in, as the channel is a mile broad, taking care not to approach too near the reef, which extends to the westward from Middle Island, and which reef is very deceptive, having some shoal patches of coral off its western extreme, not easily discernible. The western island is steep, and can be safely approached; when inside the channel, the only care required is to have a look-out at the mast-head, to avoid the coral patches, a few of which are in the centre of the bay, having 3 and 2½ fathoms on them. Care must be taken not to stand too close over to the islands bounding the eastern side of the channel, as there are several coral knolls off this part. A coral band, dry at low water, surrounds the inner part of the island, extending from 100 to 200 yards off shore—this is easily seen. The best anchorage for a ship during the S.E. trade is at Minni Minny Establishment, which bears from the centre of Middle Island S. 29° E. 7 miles. At this place, a ship anchors with the houses bearing S.E. or E.S.E., distant one-third of a mile, and one quarter of a mile off the shore reef in 10 fathoms sand, the water perfectly smooth, and boats able to land on the beach at low water.

Water and wood.

The fresh water, in wells, is close to the beach, and very excellent; fire-wood also may be readily cut. In the N.W. monsoon, the rainy season, this anchorage is rather a lee-shore, and a chopping sea renders landing at times unpleasant. Vessels ought, in this season, which is from the middle or beginning of December to the beginning or end of April, to anchor on the west side of the bay, under the lee of the land near Point Marianne Establishment, which bears from the centre of Middle Island S. by E. 5½ miles. A shoal bank of sand and coral extends off Point Marianne 3 quarters of a mile into the bay, close to the edge of which, a ship may anchor in 8 to 10 fathoms, soft sand. Point Marianne and the Establishment are known by some high trees of the fir species. Variation (1837) 2° 20′ W."

From October to February, when westerly and northerly winds may be generally expected, a ship from Bombay, intending to stop at this island, should pass to the westward of the Maldivas and Chagos Banks, and steer eastward for it, keeping in its parallel.

An earthquake, in 1812, is said to have torn asunder one of the small isles at the entrance of the harbour.

Great Chagos Bank.

"THE GREAT CHAGOS BANK, of which Blair's Bank," as mentioned in the former edition of this work, "is only a part, occupies the centre of the Chagos Archipelago. The S.E. point of this bank is nearly North from Diego Garcia, 32 miles, and in lat. 6° 42′ S., lon. 72° 29′ E.; it then takes a direction N. 30° E. 39 miles, to its eastern boundary, which is in lat. 6° 8′ S., lon. 72° 50′ E. Between these two

points it curves to the West 5 miles; from the eastern boundary the bank continues to the N. by W. 29 miles, in lat. 5° 40′ S.; it then runs West 35 miles, which is the northern and eastern edge of it. On this part lies the island I have called Nelson Island, in lat. 5° 41′, and lon. 72° 22′ E. The N.W. point of the Great Chagos Bank is in lat. 5° 49′ S., and lon. 71° 39′ E.; it then takes a direction to the S. by W. 18 miles, to the North Brother Island; it still continues further to the West, from 16 to 17 miles, and on its western edge lie the Eagle and Danger Islands, the former in lat. 6° 11′ S., lon. 71° 23′ E., the latter in lat. 6° 23′ S., lon. 71° 18′ E. The bank then takes a sudden turn to the E.S.E. about 70 miles, passing to the northward of the Six Islands, leaving a channel of 5 miles in breadth. The soundings on the edge of this bank are from 4 to 10 fathoms, sand and coral rock; the shoal water on its edges is not very broad. I consider it very dangerous; for, though the surveying vessels never found less water than 4 and 4½ fathoms, a ship would do wrong to proceed over it without a good look-out, or adopting some of the channels which lead in. On some parts of the verge of this bank not less than 7 and 8 fathoms are to be found: when inside the bank, the soundings deepen to 40 and 45 fathoms soft clay. Several coral patches, with 7 and 8 fathoms on them, will be found in the interior of the bank —there are capital spots to anchor on. Fish, such as sharks and some red rock fish, are in abundance."

Pitt Bank. Six Islands.

" PITT BANK* is to the S.W. of the Great Chagos Bank, about 17 miles; between them there is a clear channel. The Six Islands are on the northern side of this channel: this bank is of an oblong shape, placed N.W. and S.E., near 30 miles long, by 17 broad: its southern extreme is in lat. 7° 17′ S., and lon. 71° 30′ E., the northern extreme in lat. 6° 49′ S., and lon. 71° 15′ 30″ E., and bears from the centre of the Six Islands S. 42° W., distant 13½ miles, between which and the bank is a good channel."

" The trees on the Six Islands are just discernible from the poop of a ship, on the northern end of the bank. This bank is dangerous on the northern and eastern sides; on some parts of this boundary we found 6 and 4 fathoms—there may be less; on the centre of the bank the soundings are deeper, from 17 to 20, and 24 fathoms, soft bottom; like the Great Chagos Bank, it is steep all round. Close off the South end of this bank we had no soundings at 200 fathoms, yet at two miles distant we obtained deep soundings on another bank, extending to the S.E. about 18 miles, on which we had from 110 to 135 fathoms, sand and shells. Pitt's Bank ought to be avoided by navigators, more especially at night; yet in the daytime it may be passed over, if a good look-out is kept, and the shoal patches avoided. There is good anchorage on the bank."

Ganges Bank.

" GANGES BANK appears to be a discovery by the ship of this name, 12th March, 1817. It is a small bank to the S.W. of Pitt Bank, 15 miles; its centre is in lat. 7° 22′ S., and lon. 71° 8½′ E.; it is from 3 to 4 miles in extent; least water 8 fathoms, and 12 fathoms in the centre. There are no soundings near the bank at 200 fathoms."

Centurion Bank.

" CENTURION BANK was discovered in 1803, by the squadron under Admiral

* The Pitt passed over it in 1763.

Rainier, proceeding to Bombay by the southern passage. It is to the S.W. of the Ganges 18 miles; between them are no soundings; the least water on this bank is 7 fathoms, on the N.E. edge, where we observed the heavy rollers breaking at times; and where two of our boats were in danger of being swamped. We anchored on the centre of it in 14 fathoms; it is from 3 to 4 miles in extent, and in lat. 7° 37′ S., and lon. 70° 57′ E. There are no soundings close to the bank."

Owen Bank.

OWEN BANK,* situated to the westward of Diego Garcia, and considerably to the westward of Pitt Bank, and to the N.W. of Centurion Bank, was discovered 20th November, 1811, by Capt. W. Owen, R.N., when giving convoy to some transports from Batavia towards Bombay. He accidentally saw the bottom, and carried soundings of 19 and 20 fathoms for half an hour on the bank, although the other ships had no soundings: they were then in lat. 6° 46½′ S., lon. 70° 12′ E. by chronometer, from Diego Garcia in three days, and he observes, that the bank may be of considerable extent, as they probably were on it some time before it was perceived.

Six Islands.

" SIX ISLANDS, or EGMONT ISLANDS,† bearing from Diego Garcia N. 62° W., distant 69 miles. One of the largest islands of the group, on which the proprietor had built his magazines and establishment for coco-nut oil, is the south-easternmost island; it is in lat. 6° 40′ S., and lon. 71° 26½′ E. From this, five other islands lie on the circular edge of a coral reef, extending to the N.W. by W. 5 miles; the northern islands have conspicuous trees on them; there are no channels between the islands, nor soundings close to the reef, which is of an oval shape, having a lagoon in its centre, and depth of water in it from 8 to 12 fathoms; it is full of coral knolls. There is a wide channel leading into this lagoon on the north side of the circle; but only small vessels can enter, as 2 fathoms is the greatest depth of water on the edge of the reef. We found no coral bank extending off the S.W. The reef is steep close to the breakers. The current and tides sometimes wash the loose sand off the reef to leeward, and discolour the blue water for half a mile, which we took to be shoal water fit for anchorage, until we found we were deceived. These islands produce 6,000 gallons of oil yearly; pigs and poultry in abundance; also pigeons, and the fat tail land crabs, which are numerous. Fresh water is also easily procured: but should a vessel be in want of supplies, Diego Garcia, or Peros Banhos, or Eagle Island, are more convenient for anchoring and landing."

Current and tides.

Produce and supplies.

Danger Island.

" DANGER ISLAND, in lat. 6° 23′ S., lon. 71° 18½′ E., is to the N.W. of the Six Islands, and lies on the western edge of the Great Chagos Bank. The island is nearly 1½ miles in extent, low, and covered with trees; we could not land on it from the violence of the surf. It is said to be full of wild poultry, and belongs to the proprietor of Eagle Island. S. by W. from the island, distant from 2 to 3 miles, a dangerous reef extends, on which the sea breaks at times. There is good anchorage to the East of the island in 17 fathoms water, which is on the Great Chagos Bank."

* This Bank was not explored by Captain Moresby, but his position of Diego Garcia would give its longitude 70° 20′ E., instead of 70° 12′ E.

† These islands were seen by M. de Surville in 1756, by the Egmont in 1760, by M. du Roslan in 1771, and by the Eagle in 1772, by the Rumbold in 1773, by the Drake in 1774, and were surveyed by Captain Blair in 1786.

"EAGLE ISLAND, to the N.N.E. of Danger Island, 12 miles, is $2\frac{1}{2}$ miles in extent, N.E. and S.W. by half a mile to 3 quarters broad, and lies also on the western edge of the Great Chagos Bank. The island is covered with coco-trees, and some high jungle trees on its S.W. point; off which a breaking reef extends half a mile. To the S.W. of Eagle Island, distant 2 miles, lies a woody island, half-way between which and Eagle Island there is a good channel, and anchorage in 7 or 8 fathoms water, sandy and coral bottom, between the two islands, taking care not to stand to the northward of the transit line between the two islands, as the bank suddenly ceases. There are no soundings or anchorage to the N.W of Eagle Island, unless a ship would run the risk of anchoring on the bank of coral reef, extending 300 yards from the island, on which there are 5 and 6 fathoms; but this is a dangerous place, in case of a shift of wind. The village lies at the N.W. side of the island, near the centre, and is in lat. 6° 11′ S., and lon. 71° 23′ E. The landing place is opposite the village; it is bad during the N.W. winds from December to May, but good during the S. E. trade; landing is never attempted on any other part of the island, it being dangerous. A ship requiring supplies of wood, water, and poultry, may easily obtain them at this island, and may anchor as before mentioned between the two islands. The proprietor of this island obtains yearly about 6,000 gallons of coco-nut oil, a small quantity of cotton, soap, and tortoise-shell. Salt fish is also exported." Eagle Island. Supplies.

"THE THREE BROTHERS, on the N.W. verge of the Chagos Bank, and 12 to 14 miles to the eastward of Eagle Island, are small woody islands covered with coco-trees. They are not inhabited, yet belong to the proprietor of Eagle Island; the centre one is in lat. 6° $8\frac{1}{2}$′ S., and lon. 71° 36′ E.; from this, the South Brother, the largest, lies 2 miles to the S.W., and the North Brother, the smallest, 2 miles to the N.W. These islands are difficult to land upon, on account of the high surf; excepting the middle one, round which, on the east side, there is a lagoon reef, and on the north part there is a channel leading to the Middle Brother. This island does not afford water. There is anchorage to the eastward of the Brothers in various depths, from 12 to 40 fathoms. The shoaler part near the North Brother—off the South Brother a reef extends; between the South and Middle Brother there is a channel, having in the centre a rocky islet, on each side of which the soundings are from 12 to 20 fathoms. Between the North and Middle Brother is a good channel, from 35 to 25 fathoms. Close to the S.W. side of the Brothers a deep channel, with 40 and 50 fathoms in it, leads on to the Great Chagos Bank, on the verge of which, both to the North and S.W. of the Brothers, there are some dangerous shoal spots." Three Brothers.

"NELSON ISLAND, in lat. 5° $40\frac{1}{2}$′ S., and lon. 72° 22′ E., on the northern and eastern verge of the Great Chagos Bank, is the same as discovered by Captain Dixon, of the *Sivera*, and by Captain Biden, of the *Victory*, in 1835, and severally called by them Sivera and Nelson Island; the latter name I have retained. It is a low rocky island, about 12 feet above the sea, composed of rocky cliffs of sand-stone; the east and west ends of this island are covered with long grass, and a few bushes; it is nearly divided in two by a dry sand-bank, and seen from a little distance looks like two islands; from one extreme to the other, East and West, is $1\frac{1}{4}$ miles in length, by 400 or 500 yards broad; there are no soundings close off its northern side; on the east and west are several shoal spots of 4 fathoms, on the verge of the Chagos Bank; yet there is a good deep channel of 25 fathoms close to the east side of this island, leading on to the bank, where a vessel may anchor at any distance from the island in 16 to 17 Nelson Island.

fathoms, sand and coral. This island bears from the Victory Bank S. 31° E., distant 10 miles; between which there are no soundings, and from the S.W. island of the Salomon Group, S. 20° E. 21 miles."

Victory Bank.

"VICTORY BANK, in extent from 3 to 4 miles, having from 3 to 4 fathoms water on it. I consider it is a dangerous coral bank; for though we found not less than 3 fathoms, there may be less on some of the rocks. It was discovered by Captain Bidin, in the *Victory*, in 1835, and lies South from the Salomon Islands, distant 11 miles, and is in lat. 5° 33′ S., and lon. 72° 16½′ E. There are no soundings close off this bank."

Peros Banhos.

"PEROS BANHOS, the largest group of the Chagos Archipelago, and, excepting Diego Garcia, the most valuable in the production of coco-nut oil—about 34,000 gallons yearly—is the property of a gentleman at Mauritius Island, whose overseer and negro apprentices, about 90 in number, manufacture the oil. This group was discovered by the French in 1744; their situation is between lat. 5° 13½′ and 5° 27′ S., and lon. 71° 47′ and 72° 01′ E. It forms nearly a square of 50 miles in circumference, containing 27 islands of small extent, low, and covered with coco-trees; they lie nearly all on the north and west sides, two only being on the east side, four on the south side, two of which are barren, rocky islands. Between all the northern islands are good channels leading in, having 8 and 10 fathoms water. The N.W. islands are connected by a barrier reef, which continues to the southward on the west side, as far as the middle of the group, where a good channel, 3 quarters of a mile wide, leads in, having 10 and 15 fathoms water in it. The barrier again commences on the southern side of this channel, and connects the islands on the southern and western sides; it breaks off again into several channels on the centre of the south sides, close to two small rocky islands, with bushes on them, Ile Vache Marine, and Coin du Mire. Here the barrier is lost altogether above water; it can be traced under water, having 3, 5, and 7 fathoms on it. A vessel of 300 or 400 tons may pass over it, but the deeper parts ought to be chosen. A ship making Peros Banhos from the southward, or during the period of the S. E. trade winds, where a heavy swell rolls into the Atoll, would do well to enter by the southern channels, and anchor under the lee of the south-westernmost island and reef, where there is an establishment of negro apprentices on Ile du Coin. This island is the south-westernmost island of the group, about 2 miles long: 3 quarters of a mile from its east end lies a small island, with high forest trees on it. Still more to the East of this small island, distant 1 mile, lies another small island, larger than the former, but covered with low trees, and is called Ile Foquet; close to this latter island ends the barrier reef, round which a vessel may steer to enter the group; the channel here between Ile Foquet and Ile Vache Marine being 2 miles wide, with 7, 8, and 10 fathoms water in it. From the channel, a West course, 3½ miles, leads to the anchorage off Ile du Coin, in 13 to 15 fathoms water, with the houses bearing S.W., distant about 1 mile: wood, water, poultry, and some fruits and vegetables, may be obtained from the negroes. This is a good anchoring place during the N.W. winds, or rainy season; but as the northern islands are then more directly to windward, and afford better shelter for a vessel getting her supplies, I would recommend Diamond Island from December to May: it is the north-westernmost island of the group, about 2 miles long, thickly covered with coco-trees, and contains the principal establishment, which is in lat. 5° 15′ S., lon. 71° 48′ E., and due North 11 miles from the southern establishment.

(Margin notes: Ile Vache Marine. Coin du Mire. — Ile du Coin. — Ile Foquet. — Diamond Island.)

A vessel may have the use of flat-bottomed boats to bring her water casks off. Plenty of poultry, fruit, vegetables, and pigs, at six Spanish dollars per cwt. The anchorage is half a mile distant from the houses, bearing N.W. in 16 to 17 fathoms. A coral reef extends between 200 and 300 yards from the shore, which is dry at low water, and is steep close to its edge. A ship departing from this anchorage to the northward may either proceed through any of the northern channels between the islands, or if the wind is far to the North, can go through the eastern channel. In the centre of the group, on its eastern side, are two moderate-sized islands, covered with coco-trees, and called Petite Coquilage and Grande Coquilage. Close to the northern island, Petite Coquilage, there is a good channel of 14 to 15 fathoms depth of water in it; between the two islands there is also 4 and 5 fathoms; from the north side of the channel, at Petite Coquilage, a reef, dry at low water, extends up to the N.E. island, called Isle Yaye, to the West of which there is a broad and safe channel. A ship making Peros Banhos from the N.W., during the N.W. winds, may either enter by the western channel, in the centre of the west side, or by Moresby's Channel, which is the first channel on the north side, East of Diamond Island. Moresby's Channel is 3 quarters of a mile wide, and has 7 and 8 fathoms water in it, taking care not to approach too near the spit of sand and coral reef, extending off the east end of Diamond Island $1\frac{1}{4}$ miles; and which bounds the west side of the channel, as does Moresby Island the east, which are bold and safe to approach. The soundings increase in depth to 20 and 30 fathoms, soft bottom, when a vessel has entered the group. Coral knolls are numerous in the centre, and are very easily seen; the sides of them are precipitous, none of them dry at low water, generally 2, 3, and 4 fathoms on them. Close outside the barrier reef of the group we found no bottom at 200 fathoms."

*Petite Coquilage, and Grande Coquilage.* *Isle Yaye.* *Moresby's Channel.* *Moresby Island.*

"Benares Reef, or Shoal, discovered by us, is a most dangerous shoal coral patch, having only $1\frac{1}{2}$ to 2 fathoms on it, and lies W. $\frac{1}{2}$ S. from the west side of Diamond Isle, distant $4\frac{1}{2}$ miles. The sea seldom breaks on it; it is about half a mile long N.W. and S.E., and lies outside the Peros Banhos group, consequently ought to be avoided by ships making the island from the N.W. There are no soundings near it, nor between the islands and it."

*Benares Reef.*

"It is high water at Peros Banhos at 1h. 30m. P.M., rise and fall from 5 to 6 feet; the ebb tide sets to the westward, flood to the eastward; the ebb runs out of all the northern channels."

*Tides.*

"SALOMON ISLANDS,* a circular group, containing five large, and six smaller islets, is 11 miles in circumference, and has only one opening into it to the N.W.; this passage is narrow, being nearly blocked up by a shoal patch in the middle of the channel, on which there are only $1\frac{1}{2}$ and 2 fathoms. On the northern side of this patch the channel is the deepest, having 3 fathoms, and only 2 on the south side; the principal island is the S.W. island, called by Captain Blair, Boddam Island, and is in lat. 5° $21\frac{1}{2}'$ S., lon. 72° 15′ E., and 14 miles to the East of the eastern side of Peros Banhos. The N.E. island of the Salomons is called Ile de Passe, in lat. 5° 18′ S., and lon. 72° $17\frac{1}{2}'$ E., and bears from the south end of Blenheim Reef (a dangerous breaking reef) S. 81° W.; and distant 12 miles from the south end of Speaker Bank, between which there are no soundings."

*Salomon Islands.* *Boddam Island.*

* From the French ship Salomon, Captain Bourde, who saw them in 1766. They are called by Captain Blair Governor Boddam's Islands, which name Mr. Dalrymple appropriates to the harbour, and not to the islands.

"If a judgment may be formed from the soil and productions, these islands," Captain Blair remarks, "may be supposed much older than any we have visited; the soil is tolerable, and much deeper than at Diego Garcia, or Peros Banhos; consequently, the trees take much deeper root, and grow to a greater size. One sort peculiar to these islands, which appears to be very good timber, grows to the height of 130 feet, many very straight, some 4 feet in diameter, and 40 feet from the ground to the branches. The young timber is white, but the old decayed trees are of a deep chocolate colour, and the timber perfectly sound. The harbour is very secure, but the bar at the entrance makes it unfit for large ships. There are a number of shoals within, which may be easily avoided by keeping a good look-out from the mast-head, as the clearness of the water makes them easily distinguished."

Harbour secure, but has a bar at the entrance.

The articles with which these islands abound are coco-nuts and the timber mentioned; a small quantity of tortoise-shells may sometimes be procured. The tide rises 6 feet, and it is high water at 1h. on full and change of moon.

Blenheim Reef.

"BLENHEIM REEF* is a large lagoon reef, 6 miles in extent, North and South, by 2 miles broad; on the south end there is an opening to the lagoon and anchorage off it in 6 or 7 fathoms; all other parts of the reef are steep, and it has no soundings near it. The rocks are generally covered at high water, excepting some large blocks of coral and sand-stone on its eastern side. The centre of the reef is in lat. 5° 12½′ S., lon. 72° 30′ E., nearly South from the east verge of the Speaker Bank, distant 11 miles; the vicinity of these dangers has been well surveyed by us, and we may confidently say no danger exists but what we have observed. Between the Blenheim Reef and the Speaker Bank there are no soundings."

Sandy Islands.

SANDY ISLANDS, in lat. 5° 17′ S., are distant about 6 leagues from Salomon Islands, to E.N. Eastward. These are three low sandy islands, connected by rocks and breakers, seen by the Griffin, in 1749, and by other ships; also by Captain Blair, in his survey of the Chagos Archipelago, in 1786.

The Severn, Captain Adam Dixon, bound to Bombay, having experienced a westerly current and scant wind in crossing the S.E. trade, passed on the west side of Diego Garcia about 6 miles distance, December 10th, 1833, and afterward had from 15 to 30 fathoms water on two coral banks, in steering to the northward with the easterly wind. Saw a small low Sandy Isle or Isles, with a spit extending to the northward, in lat. 5° 40′ S., lon. 72° 24′ E., which are not marked in the survey of the Chagos Islands, and may, therefore, be named Severn Island.

Severn Isle.

Passed afterward between Salomon and Sandy Islands without discerning the latter, although a good look-out was kept from the mast-head. An extensive reef of breakers 3 or 4 miles in length N.N.W. and S.S.E. was discerned bearing from North to N.E. when the easternmost island of the Salomon Group bore W.S.W., distant about 9 miles. This reef, in lat. 5° 14′ S., lon. 72° 30′ E., by chronometer from Diego Garcia, allowing the latter in lon. 72° 22′ E., is apparently the northernmost danger of the Chagos Archipelago, but not marked in the survey of Captain Blair.

Speaker Bank.

"SPEAKER BANK takes its name from the ship Speaker, Capt. James Dewar, who sailed over great part of it in 1763, although the Griffin had been previously upon

* The rocks on the eastern side of this reef, which are always above water, are supposed by Captain Moresby to be the remains of the three low Sandy Islands next described.

it in 1749. It extends from lat. 4° 44′ to 5° 6′ S., and between the longitudes of 72° 17′ and 72° 30′ E. It is nearly an oval shape, lying N.N.E. and S.S.W. about 24 miles, having a slight indentation on its S.E. side, like all the other banks of the Chagos; its edges are the shoalest part; the least water is 6 and 7 fathoms on its edges, excepting the South part, where we found only 4 fathoms; no doubt the sea would break here at times when the long ocean-swell comes up with the S.E. trade. A ship ought to keep close off this part; the water deepens on the centre of the bank to 15 and 22 fathoms soft sand, and some spots of coral rock of 6 and 10 fathoms; the whole bank is sand and small coral. There are no soundings to be obtained close outside the bank.

The CURRENTS about the Chagos are generally with the wind; four months from the middle of December to the middle of April, to the eastward; other four, June, July, August, and September, to the westward, varying occasionally a little to the North or South of this direction. April and part of May, the winds and currents are variable, all November and December the same: the greatest velocity we ever found the currents have been 2 miles per hour on the great Chagos Bank; this was when the tide and current ran in the same direction. There are regular tides on the banks and islands; the flood sets to the E.S.E., and the ebb to the W.N.W.; high water, full and change, 1h. 30m. Sometimes the tides and currents run obliquely to each other, or against each other, in which case the currents are retarded or accelerated, causing ripplings, and if there is much breeze, the swell becomes short, and confused, and on the shoaler parts of the banks heavy rollers break at times, each wave having a rise and fall (by measurement) from 15 to 18 feet; this alone ought to prevent ships crossing these banks when there is much swell; yet, as I observed before, they are easily avoided, and the islands approached with safety, and affording supplies, &c., to ships that may be in want.

Currents.

Tides.

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# MOZAMBIQUE CHANNEL.

## WEST AND N.W. COASTS OF MADAGASCAR,—WINDS, CURRENTS, —THE CHANNEL PASSAGE.

### WEST AND N.W. COASTS OF MADAGASCAR.

THE MOZAMBIQUE CHANNEL, or Inner Passage, formed between the Coast of Africa and the Island of Madagascar, is in the narrowest part, nearly opposite to the town of Mozambique, about 71 leagues wide, but much broader at the southern part, opposite to Cape Corrientes.

Mozambique Channel.

Cape St. Mary. CAPE ST. MARY, the South extreme of Madagascar, is in lat. 25° 39′ S., lon. 45° 7′ E., by Captain Owen's survey of this island, from whence the coast extends in a N.E., N.N.E. and North direction to Cape Ambre, its north extremity: and from Cape St. Mary, eastward to Fort Dauphin, the coast is mostly bold, with depths of 40 and 50 fathoms, about 4 or 5 miles off shore, on a bank of regular soundings that fronts the southern part of Madagascar, which is here mountainous.

Point Barrow. Star Bank. From Cape St. Mary to the westward, as far as Point Barrow, in lat. 25° 15′ S., lon. 44° 22′ E., the depths are usually 14 or 16 fathoms about 2 or 3 miles off shore, and a bank of regular soundings, called by Captain Owen, STAR BANK, extends along the coast between these headlands, projecting 9 or 10 leagues off shore, with depths of 27 to 30 fathoms on its outer edge, about 14 leagues West from Cape St. Mary, and 8 leagues South from Point Barrow; from this outer extremity it narrows towards the coast, forming a convex outline.

Star Reefs. STAR REEFS, distant from 2½ to 4 leagues W.S.W. and S.W. of Point Barrow, consist of several detached coral reefs with high breakers on them, extending nearly N.N.E. and S.S.W. from lat. 25° 17′ to 25° 25′ S., and in lon. 44° 18′ E. Tozer Patch, in lat. 25° 12¼′ S., lon. 44° 14′ E., may also be considered a part of these reefs, and lies 7½ miles N.W. of Point Barrow, and 3¾ miles W.N.W. of Leven Island, the latter being a high isle, surrounded by a reef, about 4½ miles N.W. by N. of the point last mentioned, and a bay, called Croker Bay, is formed to the northward of the point. There is a passage inside the Star Reefs, with 16 to 8 fathoms near Point Barrow, also between the latter and Leven Island, the soundings are from 8 to 5 or 4½ fathoms in Croker Bay. This part of the coast should not be approached in the night, because the Star Reefs are very dangerous, partly above water, and distant upwards of 4 leagues from the land. H.M.S. Intrepid, at the distance of three miles from them, had no ground at 150 fathoms; her noon observation was 25° 30′ S., the outer part of the reefs bearing E.N.E. ½ E., about 7 miles distance, the land then in sight from the mast-head. These reefs are steep to, on the west side, with high breakers on this part, but between them and the coast of Madagascar there is a channel about 3 miles wide, already mentioned, through which several French ships have passed, and it is thought to be safe, if a ship keep in mid-channel.*

To the N.W. of Star Reefs, in lat. 25° 3′ S., near the coast, lies Barracouta Island, which is small, surrounded by rocks and breakers, with soundings of 12 and 14 fathoms inside, between it and the reefs that extend along the coast to the distance of 2 miles from the shore in this part.

S. W. part of Madagascar. Ships intending to touch at St. Augustine Bay, or to make the land to the southward of it, should not approach the coast to the southward of lat. 24° 30′ S., as that part in the vicinity of the Star Reefs, is little frequented. From this latitude to St. Augustine Bay, the direction of the coast is generally about N. by E., having a fronting reef at the distance of 2 or 3 miles from the shore, upon which the sea breaks high in most places. The land is of middling height near the sea, and high in the interior.

St. Augustine Bay. ST. AUGUSTINE BAY, has at the entrance NOS VEY, or SANDY ISLAND, in lat. 33° 38′ S., lon. 43° 38′ E., by the survey of Captain Owen. It is a small low island, about 2 miles from the southern shore, with shrubs on it, and a white sandy beach.

* By the survey of Captain Owen, this channel seems not advisable to be followed, except by small vessels.

A ship coming from the southward, for St. Augustine Bay, should steer along shore at 2 leagues distance; when it is approached near, the high land about it will be seen, which near the sea is of middling height, but much higher at some distance inland; a table hill, called Westminster Hall,* a considerable distance in the country, will be discerned on the north side of the bay. To sail towards the bay.

When Sandy Island is perceived, a course must be steered to pass it on the north side, where a ledge of rocks projects upwards of a mile to the N.N.W.; and to nearly a mile distance from the west and S.W. sides, it is fronted by a reef, or foul ground, which is steep on the west side, but a bank of irregular soundings extends about 2 and 2½ miles to the northward of the island. A ship may borrow on this bank to 12 or 13 fathoms in passing Sandy Island, to avoid the shoals on the north side of the bay, on which the sea breaks in stormy weather.

After passing the north end of the reef projecting from Sandy Island, in 13 or 14 fathoms water, in steering to the eastward, a piece of high land, close to the sea, on the south side of the bay, will be perceived, and another piece of high land at some distance in the country. The entrance of Onglahé River, called by the English, Dartmouth River, will then be open, and serve as a leading mark in sailing to the anchorage, by observing the marks near it.

The north point of this river is a steep bluff, and the south one, which is also steep, has a low woody point terminating it to the northward. The high bluff point ought to be kept a sail's breadth† open with the low woody point, then the bluff point of the north side of the river will bear E. ½ S.

There is a narrow channel with 10 and 11 fathoms water betwixt Sandy Island and the shore reef, and from 4½ to 6 fathoms near the island on the inside.

In running to the eastward from Sandy Island, soundings may be preserved by steering toward the first low sandy point on the southern shore, from which a reef projects half a mile, with breakers usually on it. There are 9 and 10 fathoms water close to the breakers, and 14 or 15 fathoms 2 cables' length outside of them, from whence it deepens gradually to 28 fathoms, and at a small distance farther out, no soundings.

The southern shore of the bay is low and sandy to the Tent Rock, which Captain Owen places in lat. 23° 35′ S., lon. 43° 46′ E.; this is an isolated rock, below high-water mark, about half a cable's length to the westward of the steep cliff at the water's edge, which is the west end of the piece of high land on the south side the entrance of the river. Tent Rock.

From the low sandy point to the Tent Rock, the south shore is lined by a reef, to the distance from it of more than half a mile. This reef is covered at half-tide, but the constant surf usually shews the limit of danger, except near the eastern part, where two rocks are situated on its outer edge; these are always visible when the tide is not high, appearing at 3 quarters flood, or 1 quarter ebb, like two small boats or canoes, but they are covered at high spring tides. From these rocks, the reef converges toward the shore near the Tent Rock, leaving a bank of soundings to the northward, which is the proper anchorage. Reef.

About half-way between the low sandy point where the breakers are, and the two

* This table hill, from some points of view, is thought to resemble Westminster Hall, having at each end a pointed hillock like the pinnacles of that building.

† This is the mark given by Mr. Nichelson for steering up the bay, but it is, probably, too distant as a guide for the entrance, particularly when it is considered that a sail's breadth is an indeterminate angle.

small rocks mentioned, there is a swatch in the reef, with 16 or 17 fathoms close to it, which makes the soundings not a certain guide in passing along ; for some ships have struck on this part of the reef, by hauling in towards it, when they could not get ground with the hand-lead.

Directions to proceed to the anchorage.

With the sea-breeze, which usually sets in about mid-day, a ship, after passing Sandy Island, may steer direct for the bottom of the bay, keeping a moderate distance from the edge of the reef; at other times, when the wind prevails from S.W. and southward, she ought to pass the breakers off the low sandy point in 14 or 15 fathoms, and the swatch in the reef may be passed in 21 fathoms, there being 34 fathoms water, about 2 cables' lengths farther out, and then no soundings.

Between the swatch and the two rocks which appear at 3 quarters tide, the reef is nearly steep to, in some places, but a ship may steer along, getting a cast at times, in 29 or 30 fathoms. There are 12 fathoms a small distance outside of the two small rocks mentioned, 20 fathoms a little less than a cable's length from them, and 30 fathoms N. $\frac{1}{2}$ E. from them about three cables' lengths, from whence the bank shelves suddenly into deep water.

A ship should continue to steer to the eastward, with the north point of the river bearing about E. $\frac{1}{2}$ S. till Westminster Hall is on with a low sandy point on the north side of the bay, bearing N.E. $\frac{1}{2}$ N.; she will then begin to get into tolerably regular soundings on the bank, and the two small rocks on the edge of the reef will bear about S.W. The depth decreases somewhat gradually on the bank, from 26 fathoms near the outer edge, to 9 and 10 fathoms toward the Tent Rock.

Anchorage.

The common anchorage is in 8 to 12 fathoms, the Tent Rock bearing S. $\frac{1}{2}$ E. to S. $\frac{1}{2}$ W. good holding ground, which is the best situation, and where there is most room.

The broadest part of the bank is with the Tent Rock S. $\frac{1}{2}$ E., there being soundings two-thirds of the bay over from it with this bearing. No ship should let go an anchor in more than 15 or 16 fathoms, unless it is with this bearing of the Tent Rock, and then in not more than 18 or 20 fathoms, for the bank shelves off suddenly from 24 fathoms in most places. The Intrepid, in $10\frac{1}{2}$ fathoms, had the Tent Rock bearing S. $\frac{3}{4}$ W. off shore 1 short mile. The Preston, in August, 1801, anchored in 14 fathoms, the Tent Rock, S. 6° W., distant $1\frac{1}{2}$ miles, the bluff point on the south side the entrance of the river S. 81° E., distant 3 miles, the low green point on the north side of the entrance E. $3\frac{1}{4}$ miles, a white rugged and nearly perpendicular cliff N. 63° E., and Westminster Hall N. 40° E., distant about 11 or 12 miles. The anchorage abreast the Tent Rock, is about 6 miles distant from Sandy Island.

A ship should moor East and West, that she may ride between the two anchors with an open hawse when the wind blows strong from the northward, which sometimes happens; in some places, if she moor North and South, the outer anchor would be in very deep water. During the N.E. monsoon it is considered dangerous to lie in this bay, the northerly and N.W. winds, which prevail much in that season, blowing directly into it, accompanied by a heavy swell. High water on full and change of moon at 4 hours 30 minutes. Rise of tide 13 feet. Variation 20° 8′ W. in 1824, by the survey of Captain Owen.

Tides.

Wood and water.

Wood and water are got near the entrance of the river. The Intrepid towed her water on board in rafts, but found it tedious, the distance being nearly 3 miles, and several casks were lost on the bar by the surf. At low water, spring tides, the depth on it is only 2 feet, and the stream runs almost constantly down the river, although

the perpendicular flow of tide is 12 and 13 feet on the springs. Alligators are seen in it at times.

Ships generally get a good supply of bullocks, sheep, and poultry at this place; but it has been customary to give the King of Baba a present, when a large supply is wanted, to induce him to encourage his people to trade: vegetables are scarce. The inhabitants are hospitable, but subtle and prone to revenge. Refreshments, &c.

TULLEAR HARBOUR is about 4 leagues to the north-eastward of Sandy Island, and is formed by a rocky bank running parallel to the shore, and within which there is anchorage near a small river. The coast from the point north of St. Augustine Bay to this river, is fronted by a reef* parallel to that already mentioned, and forming the eastern side of the harbour. The outer reef lies above a league from the shore in some places, and is steep to on the outside. Tullear Harbour.

The entrance to the harbour is round the north end of the outer reef, and is about a mile wide, with 14 to 18 fathoms water, decreasing in depth as you approach the anchorage, which is in 6 and 7 fathoms near Tullear Town, but the bottom being rocky this place is not frequented. The south entrance is rocky and more intricate.

The Arabella, 4th June, 1714, sent her boat a-head to sound, and followed the boat into the northern passage leading into Tullear Harbour, least water a quarter less 7 fathoms on the Bar, then deepened gradually to 12 fathoms, keeping nearest to the southern shore, and steering S.S.E. to bring Westminster Hall to bear about S.E., afterwards anchored in 6 fathoms ooze, with the Table bearing S.E. ½ E., mid-channel between the shore and the breakers, the latter bearing N.W., distance off shore 1 mile, and had 7 fathoms within a cable's length all round the ship. Procured some bullocks, &c., and on the 14th, at 6 A.M. weighed with a land breeze at S.E., least water 8 fathoms in running out over the bar. Variation in 1714, was 23° W.; in 1824 20° 8′ W. by Capt. Owen.

The coast from Tullear Bay to the northward, continues to be lined by reefs, at 2 or 3 miles' distance in some places.

MURDERERS' BAY, in lat. 22° 12′ S., lon. 43° 18′ E., is very shoal inside the entrance, where there are from 3 to 5 fathoms between the reefs, but only a few feet water inside, although the bay is 3 or 3½ miles in extent; a reef projects above 2 miles from the high land on the south side of the mouth of this bay. Murder† Island lies about 8 miles to the North of Murderers' Bay, and a reef projects 2 miles from it to the southward and south-westward, and 1 mile to the westward. Grave Island is 7 miles farther north, in lat. 21° 57′ S., also fronted by a reef; and two detached reefs, called Bowie's Reef and Parsons' Reef, are in a direct line between these islands. These islands and reefs are distant about 2½ miles from the shore, having a channel with from 6 to 12 fathoms water betwixt them and the reef that lines the coast. Murderers' Bay.

CAPE ST. VINCENT, in lat. 21° 54′ S., lon. 43° 20′ E., and 5 miles E. by N. of Grave Island, has the river St. Vincent, or Joune-a-Minty, to the North, which is Cape St. Vincent.

* The Company's ship, Winterton, was wrecked on this reef, by standing too near the land in the night.

† When engaged on the survey of the coast in 1824, Mr. Bowie and Mr. Parsons, midshipmen of H.M.S. Barracouta, under the command of Captain Owen, were assassinated by the natives on Murder Island, and buried on Grave Island; as a memorial of which, and a warning to others, these appropriate names were given to the islands, instead of 1st and 2nd, as formerly marked in the charts.

fronted by islands and reefs, the outermost reefs being about 2 leagues distant from the shore, with no soundings outside, till close to the dangers. The cape is also fronted by a detached reef, extending 4½ miles parallel to the coast, having betwixt it and the inner reef that lines the shore, a narrow channel with from 3 to 5 fathoms water, and there are 14 or 15 fathoms between its southern extremity and the reef surrounding Grave Island. To the northward of these dangers, the coast continues to be fortified by reefs contiguous to it, having a bank of soundings from 12 to 8 fathoms, extending 5 or 6 miles off; and in lat. 21° 20′ S. the land trends eastward for about 6 leagues, and is formed of many broken points and inlets, with contiguous shoals, and soundings of 9 to 15 fathoms within 3 or 4 miles of the limit of danger.

Crab and Barlow Islands.

CRAB ISLAND, in lat. 21° 4′ S., is 10 miles off shore, and BARLOW ISLAND in lat. 20° 50′ S., is nearly the same distance: these islands are small, fortified by reefs, with patches of reefs between them, and other patches lie in a N.N.E. line from Barlow Island, as far as lat. 20° 40′ S. There is a passage with from 15 to 6 fathoms water between the coast and these isles and reefs, which appear to be situated on the verge of the bank of soundings, for there is no ground 100 fathoms at a small distance to the westward of them. All the coast hereabout is low, and from lat. 21° to 20° S., extends in a N. N. E. direction, with a bank of irregular soundings from 7 to 20 fathoms, projecting 4 and 6 leagues off shore; and in lat. 19° 55′ S. about 10 leagues off, there is a bank with 16 fathoms water.

Mouroundava.

MOUROUNDAVA, in lat. 20° 18′ S., lon. 44° 19′ E., by Captain Owen's survey, is a place where some trade was formerly carried on, and where a ship may get refreshments. Water is procured in the rivers adjacent to the road. The anchorage is in 8½ or 9 fathoms, with a remarkably high tree bearing E.S.E., near the sands which bar the rivers Youle and Mouroundava. This place is seldom frequented by European ships, being exposed to N.W., S.W., and West winds.

The Arabella, August 14th, 1714, was in lat. 20° 12′ S., Youngoule or Youle, bearing S.E. about 5 miles, sent the pinnace to a canoe, which had one of the king of Timinirobus people in her, who gave us a *woman* pilot to conduct us to the anchorage. She anchored us in 8½ fathoms, Youngoule bearing S.E. 2 or 3 miles, but being too near the bar and a shoal that lies off the river about a mile, weighed and steered N. by E. 1½ miles, then anchored in 9 fathoms, Youngoule bearing S.S.E., distant 3 miles, extremes of the land from S.W. to N.E. by E., and the large tree S.E. ¼ E., which stands a little to the northward of the river. Variation 22° 30′ W. The Clapham galley had sailed 2 months before with 300 slaves, and the Arabella got 203 slaves here, and sailed September 24th for Bencoolen. In 1824, the variation off Mouroundava was 18° 7′ W. The coast from Mouroundava continues low, with shoals contiguous to Parceelas River, in lat. 19° 35½′ S., and forms a concavity; from hence it takes a N.W. direction to lat. 19° 8′ S., then about N. by E. ½ E. to 18° 51′ S., opposite to which part the southern limits of dangers on the Pracel or Barren Islands Bank commence.

Pracel Bank.

PRACEL* or PRACELLA BANK, extends a great distance from the coast of Madagascar, having several dangers interspersed over it, some of which are about 7 leagues from the coast, according to the survey of these dangers by Capt. Owen.

* Signifying hidden or invisible.

The southern limit of this bank is a little to the southward of the Barren Islands, and it reaches nearly to Cape St. Andrew; the soundings on it are in many places very uneven, the bottom being generally composed of coral and sand; and at the western edge it is steep to seaward.

BARREN ISLANDS, about seven or eight in number, have reefs and breakers projecting from some of them to a considerable distance, with other reefs far detached from them; betwixt which, and also among the islands, there are soundings from 7 to 15 or 16 fathoms. The islands are small and low, with white sandy beaches, and shrubs on them. The southernmost danger, called the South Sand, is placed by Capt. Owen in lat. 18° 41′ S., lon. 43° 58′ E. South Island in lat. 18° 34′ S., lon. 43° 56′ E. North Island in lat. 18° 18′ S., lon. 43° 46′ E. North Sand in lat. 18° 3′ S., lon. 43° 54′ E. West Breakers in lat. 18° 16¼′ S., lon. 43° 44′ E. Heavy breakers were also seen in lat. 18° 2′ S., lon. 43° 44′ E., about three leagues to the westward of the North Sand. These Islands and Reefs being situated on the southern and western edge of the Pracel Bank, several ships have been in danger of running on them in the night, when steering for the edge of the Bank. Barren Islands.

The Fox, in June, 1783, at day-break, was close to breakers when the Barren Islands were perceived at 2 or 3 miles' distance. She was obliged to make a tack or two, to clear the outermost dangers, and when close to these islands, the high regular sloping land of Madagascar was in sight from the deck to the eastward, distant about 10 leagues. Dangerous to approach in the night.

June 12th, 1792, the Montrose at day-light saw part of Madagascar E.N.E. distant about 9 leagues, and the southernmost Barren Islands bearing N. N. W. she immediately hauled to the westward and cleared them.

June 30th, 1799, the Walmer Castle and Hughes, in company, at day-light saw the northernmost of the Barren Islands bearing S. E. distant 4 or 5 leagues. They sounded and had 13, 10, 7, and 7½ fathoms coral rocks, hauled out West 3 miles, and had from 10 to 15 fathoms; from hence stood 3 miles more to the westward, deepened to 90 fathoms on the edge of the Pracel Bank, being noon, observed in lat. 18° 6 S., lon. 44° 10′ E.* by chronometer. Variation 21° W. Current setting N. E. 1 mile per hour. Coral Banks to the N. W. of them.

June 30th, 1801, the Fort William, Worcester, Airley Castle, and Hawkesbury, got soundings on the bank at 10 P.M. in 20, 18, and 16 fathoms, and anchored. They weighed and stood to the northward in the morning, with boats a-head sounding. The least water was 8 and 9 fathoms white coral and sand, and the shoal part of the bank which they passed over, is from lat. 17° 34′ to 17° 16′ S., lon. 43° 31′ E. Two of these ships at noon made the observed lat. 17° 17′ and 17° 18′ S. when in 14 and 19 fathoms, and by three different ships' chronometers at the same time, lon. 43° 29′ E., 43° 31′ E., and 43° 35′ E.; the Hawkesbury, about 2 or 3 miles more to the westward, was on the edge of the bank in deep water. Soundings on the West part of the Pracel Bank.

June 16th, 1800, the Brunswick and fleet got soundings on the Bank, 23 fathoms coral; at noon, in 22 fathoms, the observed lat. 17° 30′ S., lon. 43° 32′ E., 43° 29′ E., and 43° 29′ E., by three ships' lunar observations; from hence they steered N. N. E. ½ E. to N. E. by N. 37 miles, in soundings from 23 fathoms, increasing irregularly to 38 fathoms, afterwards no ground 40 fathoms steering N. E. ½ N.

May 10th, 1799, observed lat. 17° 9′ S., lon. 43° 40′ E. by chronometers, the Taunton

* Their longitude seems to have been too much to the eastward.

Castle was on the edge of the Bank, no ground 45 fathoms; a little before noon she had 25 fathoms on it.

July 19th and 20th, 1798, the Walpole had light winds on the Pracel Bank, soundings generally from 15 to 30 fathoms. She lay by, during these two nights, and made sail at day-light each morning: she first got soundings, 60 fathoms on the edge of the Bank, in lat. 17° 51′ S., lon. 43° 30′ E. by ⊙ ☾; on the following day in 29 fathoms, observed lat. 17° 50′ S., lon. 43° 56′ E. by ⊙ ☾, and 43° 49′ E. by chronometers; from hence, she continued to have soundings, till in lat. 16° 30′ S., lon. 44° 4′ E.

Result. By the above extracts, taken from original journals of the ships mentioned, the S. western limit of this bank appears to be in about lon. 43° 28′ E.; and from the S.W. end, contiguous to the Barren Islands, it diverges a little to the westward of this meridian to lat. 17° 22′ S., where its extreme western limit is in lon. 43° 6′ E., about 12 leagues W. by N. from Coffin Island; from hence, it begins to take a direction to the eastward of North.

Dangers. The Worcester, in 1790, got 10 and 12 fathoms rocks on the S. Western edge of the Bank, at 2 P.M., August 20th, when in lat. 18° 1′ S. from noon observation, lon. 43° 38′ E. by observation of ⊙ ☾ at the time: and from the mast-head, the appearance of breakers was seen to the eastward.

The Thistleworth, July 28th, 1714, saw rocks under the bottom, and on sounding had only 3 fathoms coral rocks, low land then discerned bearing E.S.E., distant about 5 leagues, thought to be on the main, steered N.W. and deepened fast to 30 fathoms no ground. When in 3 fathoms, was in lat. 18° 11′ S. computed from noon observation, and it was probably the northernmost of the Barren Islands, and not the land of Madagascar seen at that time.

The Nathaniel, April 25th, 1712, before day-break, struck on the reef that projects about a mile from the northernmost Barren Island, and beat off her rudder; but the anchor having been previously let go in 4 fathoms, she quickly warped off into 11 fathoms, and hung her rudder again. Observed lat. 18° 14′ S., the northernmost island bearing N. by E.; one South; another S.E.; and another S. by E. 5 or 6 leagues, being then half a mile off the reef, bearing from East to N. by W. ½ W.

As the Walmer Castle had only 7 fathoms, and the Thistleworth only 3 fathoms on the shoal coral patches to the N.W. of the Barren Islands, these islands and the S.W. part of the Bank, ought not to be approached without great caution, and a ship should haul out instantly to the westward, if she happen to get soundings on this part of the bank.

Coffin Island. COFFIN ISLAND,* in lat. 17° 29′ S., lon. 43° 47′ E. by Captain Owen's survey, or 9 miles West from Sandy Island, St. Augustine Bay, is small and low, of black appearance, with a white sandy beach; it has been mistaken for the Island Juan de Nova, by several navigators in passing, from their not having seen the adjacent coast of Madagascar, which hereabout is low near the sea, but inland has a conical peak, and is generally mountainous. This island is 10 miles distant from the coast, dangerous to approach on the N.W. and S.W. sides, as shoal detached coral banks project from it 5 and 6 miles in these directions, and it is surrounded by a reef to the distance of 1 and 1½ miles. To the north-westward of it, at 2 leagues' distance, there is a bank called Vulla Sand, nearly covered at high water spring tides, with two other detached reefs between the latter and the island, having overfalls from 18 to 4 fathoms around and betwixt them.

Vulla Sand.

* Called Savou, in the French charts, and by the Dutch, Dodkist, *i. e.* Coffin.

The Taunton Castle saw the land from the mast-head at day-light, April 18th, 1791, appearing something like a sail, bearing E.N.E. She then steered between N.E. and N.N.E. 18 miles to 9 A.M., when the water appearing discoloured, she struck on a bank of coral and sand in $3\frac{1}{2}$ fathoms, in the act of sounding. When aground, Coffin Island bore E.N.E. about 5 miles, and a sand bank N.N.E. about the same distance. To the N.W. the water was found to be very shoal, but deepened fast to the south-westward. A small anchor being laid out in this direction, the ship was hove into deep water: the tide had flowed 13 feet when the ship floated, the sand bank then nearly covered, just visible from the mast-head, the tide setting 2 miles an hour to the N.E. Whilst she lay on the coral bank, the weather was very fine, and the sea smooth; notwithstanding, her fore-foot was found much injured, on examination in Bombay dock.*

Taunton Castle grounded on a coral bank.

The cutter was sent to examine the bank to the southward and eastward of the island, and found the depths about 3 leagues to the S.E. and southward of it, generally sandy bottom, from 10 to 7 and 8 fathoms. To the eastward of the island, between it and the Madagascar shore, the depths decreased to 5 and 6 fathoms soft ground, in mid-channel, shoaling as the island or the coast were approached to 3 and $3\frac{1}{2}$ fathoms hard ground. It was therefore concluded, that the channel between Coffin Island and the adjacent coast has from 4 to 5 fathoms in it at low water, shoaling towards either shore; the water in it was thick, containing a quantity of weed, and the tide set strong through it to the northward.

Channel inside this island.

The soundings near the Island, by Captain Owen's survey, are 16, 14, and 12 fathoms, decreasing to 8 and 6 fathoms in mid-channel; which latter depths continue at the distance of 4 or 5 miles from the coast, both to the northward and southward of Coffin Island, although there are patches of 4 or 5 fathoms in some places.

When the Taunton Castle struck on the coral bank, the land last seen was the Island of Trinidad, near the coast of Brazil; after getting clear of the ground, she remained at anchor near the shoal, with light northerly winds, till the 20th; on this day, she passed the sand bank on the S.W. side, at the distance of 4 or 5 miles, deepening gradually to 22 fathoms when 3 leagues to the westward of it, then shoaled at once to 7 and 8 fathoms on a coral spit, in passing over which, the rocks were visible under the bottom; afterwards, she steered about N. by W. by compass, in soundings from 15 to 32 fathoms, till in lat. 16° 56′ S.; from hence, she steered N.E. by N., deepening to 56 fathoms in 16° 34′ S., and then no ground at the same depth.

A shoal spit to the westward of the sand bank.

Coffin Island was seen by the Princess Amelia and London, in company, August 12th, 1795. They steered E.N.E. and N.E. by E. 8 miles from noon, had three casts during this run, of 13, 20, and 22 fathoms, when at half-past 2 P.M., an island was seen from the mast-head, bearing East.

Captain Millet, of the Princess Amelia, states in his journal, "at 3 P.M., I saw from the mast-head, a small island bearing about E.S.E. by compass, also a sand bank, with a large extent of breakers bearing East about 4 leagues' distance; then in lat. 17° 30′ S., from noon observation, and from Sandy Island, St. Augustine Bay, 19 miles West by time-keeper. The breakers of the sand bank are therefore 7 miles West from Sandy Island, which may be depended upon." Variation 18° W. near Coffin Island in 1824.

Capt. Millet's description.

* This coral patch was not found by the officers under Captain Owen, although they searched for it with the Taunton Castle's cross bearings.

Chesterfield Bank.

CHESTERFIELD BANK, the centre, in lat. 16° 17′ S., lon. 43° 55½′ E.* by Capt. Owen's survey, named from the ship Earl Chesterfield, having, with the Walpole and Hector in company, passed close to it, August 13th, 1756. These ships, the preceding evening, passed in sight of Coffin Island, which is called in the Chesterfield's journals, St. Christopher's.†

From passing the island in the evening, they steered N.N.E. 38 miles, and N.E. 36 miles, when the shoal was seen in the morning, bearing from N.N.W to N.W. ¼ N., distant about 2 miles; they directly hauled out W.N.W., had 6, 7, and 8 fathoms in passing near the breakers, then at once 19, 20, and 25 fathoms; and when 12 miles to the westward of the sand, no ground 40 fathoms. The shoal is said to be about a mile in length East and West, having on it a rock, with a patch of reddish sand to the eastward of it, on which the sea broke furiously, though the weather was moderate.

Account from the Journal of the Warren Hastings.

The Warren Hastings saw this shoal, July 8th, 1787, and carried soundings on the Pracel Bank, in steering toward it, and also after passing. From 6 P.M., she steered E. by N. 27 miles, and East 16 miles to 5 A.M., in regular soundings 26 fathoms; at 6 P.M., increasing to 30 and 32 fathoms sand and shells, about midnight; and from 36 to 42 fathoms, till 5 A.M., frequently blue mud, at which time she hove to, until day-light. From 6 A.M., steered N.E. by N. 14 miles, at 8 a rock was seen bearing N. 5 or 6 miles, the depths were then 10, 13, and 18 fathoms, brown sand. From this time she steered till noon N.E. 7 miles, and N.E. by N. 21 miles, in 18 and 20 fathoms, having passed to the eastward of the shoal, and observed in lat. 16° 0′ S. From noon she steered N.E. by N. 10 miles, increasing the depth regularly, afterward no ground 30 fathoms.

Account from the Journal of the Worcester.

The Worcester also fell in with the Chesterfield Bank, August 21st, 1790. At 2 P.M., she sounded in 22 fathoms in lat. 17° 44′ S., lon. 43° 37′ E., with the wind at North she stood to the W.N.W. 5 miles, deepening to 54 fathoms, it then veering to N.W. and westward, she steered during the night mostly N.E., in various soundings from 30 to 13 and 16 fathoms, hauling off North at times when the depth decreased. At half-past 10 A.M., when in 22 fathoms mud, the shoal was seen from the mast-head, bearing N.E. by E., about 3½ leagues; steered North till noon, in soundings 22 and 20 fathoms, the shoal then E. 32° S. 7 or 8 miles. She steered northward till 3 P.M., 22nd, in different depths, from 27 to 13½ fathoms, then deepened from 25 fathoms to 30, 40, and 65 fathoms, no ground, and bore away N.E. by N.

* The journals of some of the Company's ships make it more to the eastward; but they agree in placing it about 7 miles to the East of Coffin Island, or 1½ miles less than Captain Owen's admeasurement.

† In this ship, therefore, Coffin Island was mistaken for the *imaginary* island, St. Christopher's, and the situation of the Chesterfield Shoal has been placed in the *old* charts, and described in former Directories, according to the run of this ship from St. Christopher's, or N. 5° E. from it, distant 24 leagues; whereas, the relative position of the shoal should have been marked really from Coffin Island. The journals of the Chesterfield only have been formerly consulted in assigning to this shoal its position, by which it continued more than half a century projected on the charts, at the distance of nearly 1½° from the coast of Madagascar, considerably detached from the edge of the bank; whereas, had the journals of the Walpole been equally consulted as those of the Chesterfield, this error might have been avoided.

Captain Fowler's journal of the Walpole, in company with the Chesterfield, states that the island seen in the evening could not be St. Christopher's, but an island nearer Madagascar; although they did not sound at the time, nor till 2 A.M., when the water was observed to be discoloured:—at this time, they sounded in the Walpole, had 23 fathoms, and made the signal; from hence, steering N.E. by compass, the soundings decreased to 16 and 17 fathoms at 5 A.M.; at a quarter past 5, breakers were seen close a-head, and a rock on the middle of a sand bank; at half-past 5 the breakers bore North after hauling to the westward to clear them; at 6 they bore N.E. by N. 1 mile, deepening fast from 7 fathoms near them, to 20 fathoms in standing westward.

In this ship, they judged the extent of the shoal to be about a quarter of a mile from North to South, where it is dry, consisting of reddish sand, with a black rock in the middle, and breakers surrounding the sand. It is about 12 leagues distant from Cape St. Andrew, and 11 leagues from the nearest part of Madagascar, being the northernmost danger on the Pracel Bank. The depths near it to the eastward are 20 and 18 fathoms, decreasing to 6 and 5 fathoms within $2\frac{1}{2}$ or 3 leagues of the coast. In a direction about W. $\frac{1}{2}$ N. from the shoal to the distance of 13 or 14 leagues, soundings from 22 to 18 fathoms were found by the officers under Captain Owen, or at the distance of 25 leagues from Madagascar in that direction; and from 22 to 18 fathoms were found in a N.N.E. direction to the distance of $7\frac{1}{2}$ leagues from the shoal. The variation near the shoal was 17° W. in 1824.

Directions, for avoiding the shoal.

In running to the northward, the Chesterfield Shoal may be avoided by keeping outside the bank of soundings, or by sounding on the verge of it a few leagues to the southward of the parallel of the shoal; then by steering to the northward along the edge of soundings, when crossing the latitude of the danger, or just venturing to get a cast of deep soundings at times, on the verge of the bank. Proceeding to the southward, this shoal may be avoided in the same manner, by keeping outside, or barely on the verge of the bank of soundings.

Porpoise Reef.

In lat. 16° 54′ S., at the distance of about 3 or $3\frac{1}{2}$ leagues from the coast, lies the PORPOISE REEF, even with the water's edge. The Pracel Bank, as already observed, along the S.W. and western verge, is generally steep, having a sharp declivity from 30 or 35 fathoms, to 50 and 60 fathoms no ground.

Juan de Nova.

JUAN DE NOVA, or ST. CHRISTOPHER, in lat. 17° 3′ S., lon. 42° 47′ E. by Captain Owen's survey,* has in most old charts been marked as two islands, at a great distance from each other; the Dutch, however, seem to have known that only one island did exist at a great distance from the coast of Madagascar in this part of the channel, which is called Juan de Nova in Van Keulen's chart.

Account from the Journal of the Sir Edward Hughes.

The Sir Edward Hughes passed in sight of it in June, 1797, and made it in lat. 17° 4′ S. from noon observation. This ship's journal states it to be about $1\frac{1}{2}$ or 2 miles in length, with breakers projecting 3 miles from the S.W. side, and nearly the same distance from the N.E. part; that it is low and dangerous to approach in the night.

When it bore N.E. by N. about 3 miles, at 11 P.M., H.M.S. Intrepid had no ground 150 fathoms. Captain Owen's survey makes this island $2\frac{1}{2}$ miles in extent, W. by N. and E. by S. with a reef projecting 2 miles East from its eastern point, and another reef stretching to the same distance W.N.W. from the western extremity of the Island; with a bank of soundings from 7 to 12 fathoms, fronting its northern side to the distance of 3 or $3\frac{1}{2}$ miles.

This island is distant about 8 or 9 leagues to the westward of the edge of soundings on the Pracel Bank, and it appears to be the rendezvous of aquatic birds, for there are generally great numbers in its vicinity. It may be seen about 4 leagues from the poop of a large ship, or 6 leagues from the mast-head, having a small elevation at the centre, where it is covered with shrubs. Variation near it 16° West in 1824.

Account from the Journal of the Scaleby Castle.

The Scaleby Castle, in company with the Bombay and China ships, passed it on the west side June 3d, 1807. At noon, it bore East, *true*, distant 3 or 4 miles, had

* Captain Loch, of the Scaleby Castle, and other officers of the Company's ships, made it in lat. 17° 4′ S., lon. 43° 2′ E., or 15 miles to the East of Captain Owen's longitude.

then no ground 60 fathoms; from hence, made a *true* North course $1\frac{1}{2}$ miles, and had 2 casts no ground 60 fathoms; steering the same course about half a mile farther, got soundings $9\frac{1}{2}$ fathoms sandy bottom, the body of the island bearing then *true* S. 34° E., distant about 3 or 4 miles. From this station, steering North and N.N.W. about $1\frac{1}{2}$ miles, carried regular soundings, deepening from $9\frac{1}{2}$ to 15 fathoms, then suddenly no ground 40 fathoms, when about $4\frac{1}{2}$ or 5 miles to the N.W. of the island. The other ships farther out, had no ground in passing. The island appeared to be about a mile in diameter, with a reef projecting at least 2 miles to the southward, and nearly the same distance to the N.W. and N.E. of the island, with discoloured water projecting from the reef at the N.W. end. Captain Loch thinks that it was on the tail of the N.W. reef, where they got soundings in passing, and advises not to come nearer the island than $3\frac{1}{2}$ or 4 miles on the West side, there being no danger at that distance.

He estimated its elevation about 40 feet above the sea, but it cannot be seen more than 6 leagues from the mast-head, and being surrounded with breakers, the first intimation of its proximity in the night would *probably* be their noise.

Koora Kyka, &c.

KOORA KYKA is a small place, in lat. 17° 53′ S., to the south-eastward of Coffin Island, where a ship may anchor, and procure water in case of necessity; close to the northward of this place, lies the small river Vulla, directly opposite to Coffin Island, and 8 leagues farther northward is the river Manumbaugh, in lat. 17° 11′ S. Between Coffin Island and the coast, there are irregular depths of 14 to 8 fathoms near the island, shoaling to 6 and 5 toward the coast: if a ship intend to pass through this channel, or to anchor at any of these places, caution is requisite to avoid the coral patches interspersed along the western coast of Madagascar. The tides set strong through the channel, between Coffin Island and the main land.

Cape St. Andrew.

CAPE ST. ANDREW, in lat. 16° 11′ S., lon. 44° 31′ E., by Captain Owen's survey, is about 29 or 30 leagues to the N.E. of Manumbaugh River; and it being the north-western extremity of Madagascar, the land from hence takes an easterly direction. The N.W. coast of Madagascar from this Cape to Cape Ambre, had for a century been little known to English navigators, until Captain David Inverarity explored the harbours, and nearly the whole of this part of the coast, during a trading voyage along it, in 1802. And in 1824 and 1825, the whole of the coast line and the harbours of this extensive island were examined and surveyed by H.M. Ships Leven and Barracouta, under the command of Captain W. F. W. Owen.

Boyana Bay.

BOYANA BAY entrance, or the N.W. point, called TABLE CAPE, is in lat. 15° 59′ S., lon. 45° 23′ E., the direction of the coast being from Cape St. Andrew, about East. This bay is about 3 miles wide in the entrance, and 6 or 7 miles in length, extending South, with depths from 6 to 4 fathoms, which shoal to 2 and 1 fathom near the shore and at the bottom of the bay, around which there are several small villages. At the N.E. angle of the bay there is a cove or circular basin nearly filled with shoals, but in the entrance there are 2 and 3 fathoms, with 6 or 7 fathoms water a little way inside at low tide, and the rise is 15 feet; high water at $4\frac{1}{2}$ hours on full and change of the moon. Variation 15° 5′ W. in 1824.

Tides.

False Cape.

False Cape, in lat. 15° 46′ S., lon. 45° 43′ E., is a rocky headland, about 4 leagues to the southward of which lies the mouth of Boteler River, fronted by numerous banks and shoal flats, but has 8 and 9 fathoms water inside, in some places.

Makumba River.

Makumba River, about $5\frac{1}{2}$ leagues more easterly, in lat. 15° 46′ S., lon. 46° 0′ E.,

is also fronted by shoal banks, but there is a channel with from 4 to 10 fathoms water near the eastern shore, in a S.W. direction, then round the eastern point to S.E. and eastward, where a vessel may anchor land-locked in 4½ to 6 fathoms water.

BEMBATOOKA BAY is large and safe, Manjunga Point on the East side of the entrance, being in lat. 15° 43′ S., lon. 46° 20′ E., by Captain Owen's survey. The entrance is about 3½ miles wide, clear of danger, the depths irregular, from 18 or 20 fathoms, to 7 and 6 fathoms in some places, particularly near Point Sareebingo, on the east side of the entrance, inside of which is the village Majunga, or Majunghai. The depths from the entrance, by keeping more than mid-channel towards the western side of the bay, are from 10 to 20 fathoms to Tandava Point, which is about 2½ leagues within, on the east side, having a reef extending around to the distance of a mile from the shore, and along the eastern side of the bay: reefs also front the western shore opposite to Tandava Point. Bembatooka Town is on the south side of this point, where ships may lie land-locked, sheltered from all winds, in 4, 5, or 6 fathoms, close under the point near the town. From Bembatooka, the bay widens and becomes a basin, shoaling about 3 miles within its entrance, and at the head of which several small rivers discharge themselves, having islands fronting their entrances. Variation 15° W. in 1824. Rise of tide about 16 feet. This bay is an eligible place to refresh a fleet of ships. Bullocks are plentiful at 2 dollars each; rice, and other articles, may also be procured at reasonable prices. Bembatooka Bay. Tides. Supplies.

MAJAMBO BAY, the west point bears E.N.E. from Bembatooka Bay entrance, distant about 50 miles, and is in lat. 15° 12′ S., lon. 46° 59′ E. The entrance is about 5 miles wide, narrowing gradually to 2 miles, where, at the distance of 3 leagues from the entrance, it opens into a capacious basin or inner harbour. The soundings in the outer bay are irregular, from 9 to 35 fathoms, and those in the inner harbour more irregular, varying near its entrance from 4 to 68 fathoms, the greater part of the basin, from its centre towards its farther shores, being shoal, except under its western entrance point (Point Tchinsamansey), where there is anchorage in from 8 to 10 fathoms, land-locked, and sheltered from all winds. This bay has several rivers falling into it, with a table hill near the rocky point on the east side of the entrance. The tide flows here on full and change to 4½ hours, and rises 16 feet. Variation 13° 6′ W. in 1824. Majambo Bay. Tides.

PORT MAZAMBO, in lat. 14° 54′ S., lon. 47° 19′ E., appears by Capt. Owen's survey, to afford good shelter for moderate sized vessels: having from 2½ to 7 fathoms in the outer part, with 4 and 5 fathoms water inside the island, at the mouth of the port or basin, where vessels might anchor in safety from all winds. Port Mazambo

NARREENDA BAY entrance is between the Island of Nos Sancassee to the N.E. and Moormona Point on the west side; the latter bearing N.E. ½ E. from the west point of Majambo Bay, distant about 15 leagues. The north point of Nos Sancassee is in lat. 14° 31′ S., lon. 47° 35′ E.; and between the reef that fronts it and Moormona Point, in lat. 14° 41′ S., which is also fronted by a reef, the entrance into Narreenda Bay is full two leagues wide. Its general direction is about S.W. ½ S. extending about 8 leagues inland, and is 8 or 9 miles broad near the entrance, and 5 or 6 miles in breadth at the village Narreenda, situated on the banks of an inlet near the bottom of the bay on the eastern side. The general depths are 15 to 11 fathoms near mid-channel, and along the western shore; 5 fathoms toward the bank on the Narreenda Bay.

eastern side, and 4, 5, and 6 fathoms where the anchorage is, opposite the village of Narreenda, where the governor resides. The deepest water is near the western shore. Tides. High water at $4\frac{1}{2}$ hours, on full and change of the moon; rise of tide 15 feet. Variation 12° West in 1824. There are passages for small vessels between Nos Sancassee and the eastern shore, formed by reefs which surround the two small islands that lie off the mouth of Luza River; Luza River. this river has two fathoms on the bar at low water, with great depths inside, forming an excellent harbour, and its entrance is in lat. 14° 37′ S., about 7 miles to S.E. $\frac{1}{2}$ E. of Nos Sancassee.

Radama Islands. Port Radama. RADAMA ISLANDS, four in number, between lat. 14° 13′ and 13° 56′ S., are of considerable size, particularly Nossuvee, the central one, which fronts Port Radama, at 3 leagues' distance from its entrance: Point Blair, in lat. 13′ 59′ S., lon. 47° 58′ E., bounds the entrance of this port on the north side, and Point Inverarity to the South; both have extensive reefs projecting far out from them, and several shoals and reefs front the entrance of Port Radama, with others inside, and lining its shores; but there are depths from 7 to 15 fathoms in the fair channel of this port, which is an inlet of the sea from 4 to 3 miles wide, extending first to the S.E. by E. about 3 leagues, and then to the southward a great way inland. Raminitoc Bay. Raminitoc Bay, formed to the southward of Point Inverarity, is extensive, and interspersed with several shoals; its S.W. extremity, Point M'Cluer, being in lat. 14° 15′ S., lon. 47° 49′ E., and Nossambilleha, the southernmost Radama Island, fronts the mouth of this bay, having a passage on either side of very irregular depths, from 20 to 5 or 6 fathoms. Rafala Bay. Rafala Bay is formed on the north side of Point Blair, and the great reef that projects 4 miles N.W. by W. from this point; reefs also stretch along the shores on both sides of this bay, which extends about 2 leagues inland, with depths usually from 9 to $4\frac{1}{2}$ fathoms near the upper part.

There are several shoal patches with only $2\frac{1}{2}$ or 3 fathoms water on them, at the distance of 2 leagues outside the Radama Islands, which render great caution necessary in any ship passing along this part of the coast, or intending to proceed into any of the bays mentioned above.

Dalrymple Bay. DALRYMPLE BAY entrance is in lat. 13° 30′ S., lon. 48° 2′ E. the entrance, situated near the north extremity of the peninsula on the west side of the great bay Passandava. It has from 8 to 12 fathoms in the entrance, which is half a mile wide between the reefs, from 6 to 9 fathoms inside, and is recommended as particularly safe and commodious for wooding, watering, and refitting ships. When coming in, keep nearest to the west point of the entrance, which has, about $2\frac{1}{2}$ or 3 miles to the N.W., a small island, called Passage Island, near the north point of the land; when it bears West $1\frac{1}{2}$ miles, the course is directly South true bearing into Marbacool Bay, which abounds with fish, but is not inhabited; a ship may anchor either in the south-eastern or south-western arm of the bay, in from 6 to 9 fathoms.

Passandava Bay. PASSANDAVA BAY is a large and deep bight on the east side of the peninsula already mentioned, extending in a southerly direction, from the entrance to the distance of 6 leagues. Off the east point of the bay lies the large island of Nos Beh, between which and the point, is the smaller island of Nos Cuba, with the little islet called the Nine Pin, about 4 miles South of the former and West of the latter, in lat. 13° 28′ S., lon. 48° 15′ E. At the head of the bay, in lat. 13° 45′ S., lies Passandava Town, about 2 miles off which, the depths are 4, 5, and 6 fathoms, increasing to 20

and 22 fathoms towards the entrance, but not always regular. The great channel is to the westward of the islands, but there is a passage to the eastward of them, by which small vessels may enter the bay. Variation 12° 5′ W. in 1824. High water at 5 hours on full and change of moon; rise of tide 15 feet. There is a watering place on the west side of the bay, inside of the two northernmost Mamoska Isles, which are small, with shoals projecting to the N.W. of them. Tides.

Bullocks and refreshments, wood and water, may be procured in great plenty, and on reasonable terms, at most of the above places. The inhabitants are shy to strangers, until acquainted with their business; but they seemed to be an inoffensive, fair-dealing, and hospitable people. Supplies.

MARBACOOL BAY, situated close to the north-eastward of Passandava Bay, formed by Nos Beh, and Nos Cuba on the West side, and on the East side by Chimpaykee Island, and its adjoining peninsula, has depths from 12 to 5 fathoms, and appears to afford good shelter. But the wide Bay of Chimpaykee, on the east side of the peninsula and island of this name, is open to North and N.W. winds. Marbacool and Chimpaykee Bays.

From the Island Nos Beh, Cape St. Sebastian bears about N.E. ½ N., distant 18 leagues, the land forming a concavity between them, and from the Cape trends about S. by E. and South 10 leagues; then S. by W. and S.S.W. 9 leagues farther; from hence it turns sharp round to the West towards Nos Beh, forming Chimpaykee Bay, already mentioned.

THE MINOW ISLANDS extend from lat. 13° 3′ to 12° 43′ S., the outermost being 7 leagues distant from the land; the North end of Great Minow Island is in lat. 12° 49½′ S., lon. 48° 39′ E., from whence it extends in a narrow ridge S.W. by S. about 3 leagues, and here forming an acute angle, turns to the N.W. by N. about 5 miles farther, in a ridge of the same breadth, which is about 1 mile. There are several reefs amongst the small isles to the South and S.W. of Great Minow Island, with depths mostly from 10 to 20 fathoms between the isles; and between them and the coast, 14 fathoms, decreasing to 6 and 5 fathoms toward the latter. Green Island lies in the channel inside of these isles, about two leagues off shore; and the northernmost, or Little Minow Island, is 7 miles to the N.E. of the northern extremity of Great Minow Island. Minow Island.

CAPE ST. SEBASTIAN, in lat. 12° 26′ S., lon. 48° 46′ E., by Captain Owen's survey, is the extremity of a crooked peninsula, that projects about 3½ leagues from the main land, formed of peaked hills, and having a large deep bay on the eastern side of the peninsula, with two small bays on the western side, one of which is 3 miles to the eastward of the extremity of the Cape: several isles front the latter bay, and two reefs or sandy isles lie off the mouth of the large bay to the eastward. Cape St. Sebastian to Cape Ambre.

Several small islands encircle the Cape at a little distance, betwixt which and the Andromache Islands, that bear about W. by N. from 3 to 4½ miles from the Cape, there is a channel with 18 to 24 fathoms water. Joseph Island, 3 miles North of Cape St. Sebastian and nearer the North point of the peninsula, has a narrow bank of 4 to 6 fathoms off it towards Woody Island, to the extent of 3 miles, on each side of which bank, and round the island, the general depths are 10, 15, and 19 fathoms. Woody Island, in lat. 12° 16′ S., is 7 miles N. by W. ½ W. from Joseph Island, having irregular depths near it of 5 to 14 fathoms, and 7 fathoms overfalls about 3 miles outside of it, on the edge of the bank of soundings; there are also 4 fathoms

overfalls on the edge of the bank, about 4½ leagues to the westward of the Cape, rendering great caution necessary in ships which approach this part of the coast; but the depths farther in upon the bank usually increase to 30, 35, and 20 fathoms irregular soundings.

From Cape St. Sebastian, the distance is about 15 leagues N.E. by E. to Cape Ambre; the coast for the greatest part of the distance forms a very wide bay, named William Pitt Bay, by Capt. Owen, in which are several islands and shoals near the land, and others 3 or 4 leagues off, on the verge of the bank of soundings, where there are many 4 and 5 fathoms patches, and the following sands above water. Delight Sand in lat. 12° 13¼′ S., lon. 48° 49′ E. Magnet Sand in lat. 12° 18′ S., lon. 48° 55′ E., and Moresby Island about 2 leagues farther to the E.N.E. towards the northern extreme point of Pitt Bay, which is also fronted by rocky shoals: inside of which, two bays are situated, with depths of 7 to 4 fathoms, the easternmost called Port Chancellor by Capt. Owen.

Outer sands.

Between the low peninsula that forms the north-eastern boundary of Pitt Bay and Cape Ambre, there are three deep inlets discovered by Capt. Owen, the shores of which are lined by reefs, but they appear capable of affording safe shelter for ships, and have been named PORTS LIVERPOOL, JENKINSON, and ROBINSON. The entrance of Port Liverpool is in lat. 12° 3′ S., lon. 49° 12′ E. by the survey of that officer, with from 16 to 22 fathoms water, decreasing to 9 and 7 fathoms near the upper part of the harbour, which is about 4 miles in a S.E. direction from the entrance. The entrance of Port Jenkinson, distant about 2¾ miles N. Eastward from Port Liverpool, has depths 7 to 10 fathoms, decreasing to 5 and 4½ fathoms at the upper part, which is about 1¾ miles S. Easterly from the entrance, and is altogether much more contracted than Port Liverpool. The entrance of Port Robinson is in lat. 12° 1′ S., distant 1¼ miles N.E. of Port Jenkinson, and about 2 leagues to the S.W. of Cape Ambre, being nearly a quarter of a mile wide, with depths of 8 and 10 fathoms, and nearly the same inside, to the upper end of the harbour 1¾ miles to the E.S.E. of the entrance: this seems to afford complete protection from the wind and sea in every direction, but Port Liverpool is the most capacious of these harbours, being about one-third of a mile wide in the entrance between the reefs, opening to a spacious basin a little way inside.

Liverpool, Jenkinson, and Robinson Ports.

From Cape St. Andrew to the north end of Madagascar, a bank with soundings extends along the whole of the coast, projecting from it 2 or 3 leagues in some places, and in others to the distance of 8 or 9 leagues from the shore. Ships drawing more than 12 feet water, should be very careful in approaching the edge of the bank, where in many places there are only 3 fathoms coral. Several of these coral flats are of considerable extent, and generally situated on the verge of the bank of soundings; it is therefore requisite to keep a good look out from the mast-head for discoloured water, or keep a boat a-head sounding.

Bank of soundings between Cape St. Andrew and North extreme of Madagascar.

The dangers now to be described are situated nearly in mid-channel, towards the southern entrance of the Strait of Madagascar.

Europa Rocks very dangerous.

EUROPA ROCKS, or SHOAL, called Bassas da India by Capt. Owen, were seen by the Europa, December 24th, 1774, bearing from S.W. by S. to S.E. by S., distant 2 or 3 leagues; the largest of the rocks appeared about the size of a long-boat, with the sea breaking over them, which makes it a very dangerous reef, for there are no soundings until very close to the rocks.

Captain Huddart saw it in the Royal Admiral, August 23rd, 1784. Nothing was perceived above water, except scattered rocks like hay-ricks, though probably some

part of the flat may dry at low water; at the exterior part, the sea breaks heavy all round. The pinnace was sent to the back of the surf, and sailed round the south and west sides in from 3 to 12 fathoms, within 20 or 30 yards of the breakers, while the ship kept from about 1 to $1\frac{1}{2}$ miles off them, and had no soundings with 40 to 70 fathoms of line, for an extent of 14 miles on the south and west sides, but could not ascertain how far it extended to the eastward. The part visible lay in a direction from E. S. E. to W.N.W. 13 miles, and from N. N. E. to S. S. W. 6 miles. The northernmost extreme of the shoal, was found to be in lat. 21° 28′ S., and the westernmost part by chronometer in lon. 39° 58′ E.* Position by Capt. Huddart.

The Company's ship Kellie Castle, on her passage to Bombay, saw this danger, May 21st, 1821, and passed to the westward about 6 miles distant. When the small rocks like Haycocks on the N. E. end of the shoal bore E. by S., a large rock E. S. E., with a long dry sand bank extending to the S.W., the S.W. end of the shoal then bore S. S. E. $\frac{1}{2}$ E., with high breakers on this part; and the limits of the danger were distinctly seen, except to the eastward. The north end of the shoal was observed to be in lat. 21° 27′ S., and its western part in lon. 39° 45′ E. by observations on both sides of the moon taken two days previously, and carried on by chronometer, and in lon. 39° 57′ E. by observations of sun and moon taken on the 22nd, after passing the shoal. Capt. Owen, of H.M. ship Leven, examined this danger during his survey of those seas, and made the S. E. end, or East point of the shoal, in lat. 21° 29′ S., lon. 39° 41′ E., and the N.W. point in lat. 21° $26\frac{1}{2}$′ S., lon. 39° 33′ E.—The south extremity is in lat. 21° $31\frac{1}{2}$′ or 21° 32′ S. Variation 21° 9′ W. close to it in 1824. Position by Capt. Owen.

BASSAS DA INDIA,† called Europa Island by Capt. Owen, which he places in lat. 22° $22\frac{1}{2}$′ S., lon. 40° 24′ E., is an island about 3 or 4 miles in diameter, of circular form, with an indentation on the north side; and it is highest at the northern part, with several small hummocks in other places, and a sandy beach fronting the sea. Capt. Owen describes the island as easy of access, and abounding in turtle. He also makes it much larger than hitherto supposed, and suggests that it should be called Europa Island, and that Europa Rocks should be named Bassas da India. Island Bassas da India, or Europa Island.

The David Scott, June 4th, 1804, having steered N. E. by N. 4 miles from lat. 22° 38′ S., this island was seen from the mast-head at half-past 1 P.M., bearing E. by N. or E. N. E. about 5 leagues. At this time they sounded, and had two casts, 55 and 52 fathoms rocky bottom. From hence, an E. N. E. course was steered to get a nearer view of the island, when at 5 P.M. the N.W. part bore S. 88° E., distant about 4 miles, and the other extreme S. 55° E. After having the two casts of ground when the island was first seen, no more soundings were obtained in standing towards it, and none are thought to be had at the distance of 2 or 3 miles. The journal describes it to be a low island with many trees, and a white sandy beach along the west side, without any appearance of shoals or rocks, and it may be seen from the mast-head at the distance of 5 or 6 leagues in clear weather. Account by Captain Jones, of the David Scott.

Capt. Jones, of the David Scott, made the body of the island in lat. 22° 28′ S., lon. 40° 34′ to 40° 39′ E. Variation $23\frac{1}{2}$° W.

* In a run of three days, the Royal Admiral measured by chronometer $22\frac{1}{2}$ miles East from the Europa Rocks, to the northernmost of the small islands on the coast of Angoxa, in lat. 16° $21\frac{1}{2}$′ S.

† Named by the Portuguese discoverers Baxos da Judia, or the Banks of the Jewess; and are still called so by that nation, as well as by all European navigators, except those of our country, where the first charts of these parts, copied from the Portuguese, having changed the letter u into an n, substituted the word India, for that of Judia.

Account by Capt. Donaldson, of the Neptune.

The Neptune, Capt. Donaldson, March 27th, 1812, saw this island from the mast-head at $10\frac{3}{4}$ A.M. bearing N. by W. At noon it bore N. 40° W. to N. 70° W. distant 5 or 6 miles, the south end of the island then bore *true* West, and by good observation that part was found to be in lat. 22° $26\frac{1}{2}'$ S., lon. 40° 37′ 33″ E. by means of lunar observations and chronometers corresponding within 5 miles.

Position by Captain Rush, of the Royal Charlotte.

The Royal Charlotte, Capt. Rush, in company with the Neptune, measured by chronometers 3° 44′ East from Bassas da India to Saddle Island at the west end of Johanna, which is situated in lon. 44° 21′ E.; by this measurement the former island will lie in lon. 40° 37′ E., corresponding with Capt. Donaldson's longitude, as stated above. Capt. Owen, nevertheless, in examining this island in 1825, made it 13 miles to the westward of these observations, as already noticed.

Appearance of the island.

When first seen from the Neptune it seemed merely a sand bank, but on a nearer view, was found to be covered chiefly with brush-wood excepting some trees on the North end, which made that part of the island look more elevated than the rest of it, although these trees were far from lofty.

The east side of the island, and every part seen by these ships, had a beautiful white sandy beach, perhaps white coral, with the appearance of being safe to approach, as nothing like a reef or breakers could be discerned; but a reef projects half a mile or more, from the south end of the island. Variation near it 21° W. in 1825.

Caution when making the mid-channel passage.

It has been already remarked, that the mid-passage through the Mozambique Channel, seems preferable to that along the Madagascar shore, when ships are certain of the longitude; but caution is requisite, when the parallels of Bassas da India, Europa Rocks, and Juan de Nova are approached in the night, for a ship might be close to the breakers before they were perceived, particularly in hazy weather, which prevails in this channel. Neither should the African coast be approached close, on account of southerly currents, and baffling winds, often experienced there.

## WINDS AND CURRENTS.

THE SOUTH-WEST MONSOON, which is the fair season in the Mozambique Channel, begins in April and continues till November; the N. E. monsoon then commences, and prevails until April.

Periodical winds and currents.

During the S. W. monsoon, the winds vary from S.W. to S. E. and E. S. E. particularly near the south end of Madagascar, they blow often from S. E. and East, brisk and moderate breezes; close to the African coast, land breezes are frequent. In mid-channel, they are more steady, generally blowing right through, when the distance is equal from either shore. But there are exceptions to this general observation, for in the southern part of the channel, light variable winds, and westerly currents, have sometimes retarded ships bound to India by this channel.

From lat. 24° or 25° S. to 15° or 16° S. light variable winds from East and N. E., with westerly currents, have sometimes been experienced during the S.W. monsoon; this happened to the Sir Edward Hughes, in July, 1802, although at such times, southerly and south-easterly winds may be generally expected.

N. E. Monsoon.

THE N. E. MONSOON, commences early in November, at the northern part of the Mozambique Channel, but toward St. Augustine Bay, not till the end of this month, and seldom extends farther South, the prevailing winds between Cape Corrientes and the S.W. part of Madagascar being southerly, varying from S. E. to S.W. during both monsoons.

In the Mozambique Channel, squalls from West to N.N.W. may at times happen during the S.W. monsoon, but never continue long. It is chiefly during the N.E. monsoon that storms arise, when the S.E. and S.W. winds, which prevail without, are blowing strong; these winds blow into the channel, and are resisted by the N.E. and N.W. winds, which produce a high turbulent sea, and sometimes whirlwinds, by their opposing force. At such times, the sky is overclouded, and the rain heavy. Squalls and Gales.

THE CURRENTS in the Mozambique Channel, during the N.E. monsoon, generally set to the southward along the African Coast, and also in the offing, from 18 to 28 miles daily; but on the coast of Madagascar, they run to the northward. On the African side, they set southerly most of the year, though they are liable to change in both monsoons, when the weather is precarious, and set to the northward for a short time. Currents.

On the west coast of Madagascar, the current at times sets to the northward during the S.W. monsoon; and on the African Coast, generally to the southward. It is often changeable about mid-channel. Among the Comoro Islands, and between Cape Ambre and the coast of Querimba, it sets westerly all the year round.

## THE CHANNEL PASSAGE.

THE ROUTE BY THE MOZAMBIQUE CHANNEL is more direct than any other, for ships bound to Bombay, Ceylon, or the Coromandel Coast, when the S.W. monsoon prevails on those coasts, for it predominates in the Mozambique Channel at the same time. This route is generally preferred in times of peace: but in war, many navigators have adopted the passage to the eastward of Madagascar, where they are not so liable to light winds, nor to fall in with shoals, as in the inner passage. The passage outside of Madagascar, although the distance is greater, may, by these advantages, be made as quickly as the other; and instances have occurred of ships separating to the eastward of the Cape, some adopting the inner passage, and others the outer passage, the latter arriving first at Bombay. The inner and outer passages compared.

In entering the Mozambique Channel, and bound to the Comoro Islands, a ship departing from Sandy Island, or having seen the land about St. Augustine Bay, may steer N. by W. or N.N.W., until 8 or 10 leagues from the shore, then steer about N. by E. or North. The direction of the coast to Point St. Felix, in lat. 22° 36′ S. is about N.N.W. *true*, or rather more westerly in some places. A North and N. ½ W. course may be steered in the day, which is parallel to the coast as far as Point St. Felix, but in the night the coast should not be approached close, for high breakers stretch along it; and it is low in several places near the sea, composed of sand downs, with verdure interspersed. Point St. Felix is a sand hill, with some trees on it. The variation here in 1798, was 23° 30′ W. Entering the channel from the southward.

In lat. 22° 4′ S., nearly on the meridian of Point St. Felix, a small island is situated, formerly called First Island,* and 8 miles farther northward, is Second Island,† already mentioned, and also Crab Island about 11 miles from the land, in lat. 21° 4′ S. About 5 miles N.E. of Second Island, the projecting part of the coast is called Cape St. Vincent, from whence it takes a N.N. Easterly direction towards Moroundava, having several sand banks between them, from 3 to 4 leagues off shore. First, Second, and Crab Islands.

* Called Murder Island by Capt. Owen.

† Called also Grave Island.

Sailing through the channel to the northward.

After leaving the coast about St. Augustine Bay, or Point St. Felix, steer to pass well to the westward of Crab Island, by getting 30 or 40 miles West of Sandy Island, when near the parallel of the former; then steer *true* North, keeping about 40 or 45 miles West of the meridian of Sandy Island, which will lead to the westward of the Pracel Bank; and when near the latitude of the Island Juan de Nova, it will be proper to reduce the longitude made by chronometers from Sandy Island, to about 25 miles West, in passing. This will carry a ship to the eastward of Juan de Nova, and the same meridian preserved, will lead to the westward of the Chesterfield Shoal.

A good look-out is requisite when crossing the parallels of these two places, and from hence a direct course may be steered for Johanna, if to touch there; in such case, it will be proper to pass between it and Mohilla. If not to stop at any of the Comoro Islands, pass through any of the channels between them, or to the westward of Great Comoro, as circumstances require. Amongst these islands the current generally sets westward, rendering it prudent, when bound into Johanna, early or late in the season, not to fall to the westward of Mohilla, as the winds are frequently light and variable at these times.

Current near the Comoro Islands.

The route here described, is recommended in preference to that along the coast of Madagascar, over the Pracel Bank; but the latter having been much used in former times it is proper to point out the contiguous dangers.

The positions of the dangers in the Mozambique Channel being now tolerably well known, and since marine chronometers have become in general use, this route is much safer than formerly. Before the use of lunar observations and chronometers, ships running for the Mozambique Channel, after leaving the Cape, or the Cape Bank, were liable to great errors in their longitude, in consequence of the strong S.W. and westerly currents. Many ships, after shaping a course for the middle of the channel, have fallen in with the African Coast. The Doddington, in 1756, steering in the night E.N.E. by compass, struck a little to the eastward of Algoa Bay, and most of the crew perished.* The Grosvenor, bound home, was wrecked farther to the north-eastward, 4th August, 1782; the crew and passengers, after reaching the shore, and suffering great hardships, were thought to have fallen a sacrifice to the natives, but three or four of them reached the Cape. Since that time other ships have been wrecked on this coast, from errors in their reckoning, and from westerly currents.

Of errors in making the channel.

Current between Madagascar and the Cape.

Although the current generally sets to the West and S.W. between the south end of Madagascar and Cape Agulhas Bank, it sometimes sets to the south-eastward between Cape Corrientes and the Island Madagascar with considerable velocity, producing a contrary error in the reckoning.

Instances of errors in reckoning.

The Prince of Wales and Britannia, in company, in 1762, fell in with the land about midnight, near St. Augustine Bay, when they supposed themselves near mid-channel.

The St. Jean Baptiste, French Indiaman, was lost on the Star Bank in 1777, on account of the ship being to the eastward of her reckoning, and 39 only, of 120 people, were saved; these survivors reached St. Augustine Bay in the boat, and on landing were made slaves by the natives; 19 only of the 39 survived their captivity, in which they remained 7 months, and then were ransomed by a Dutch ship.

The French ship, Notre Dame du Mont Carmel, in 1785, made the Star Bank, having experienced an easterly set of 4° from soundings on the Cape Bank.

* By the dead reckoning, this ship was near 6° to the eastward of the place where she unfortunately struck, and went to pieces in 20 minutes.

These examples of errors in the reckoning, both to the eastward and westward, evince the propriety of caution in running for the Mozambique Channel, when not confident of the longitude.

Ships bound to the Mozambique Channel, to guard against the south-westerly and westerly currents, which may be expected after passing the Cape Bank, should not edge away too soon to the northward, particularly if it be intended to see the Coast of Madagascar to the southward of St. Augustine Bay, or to stop there for refreshments. At most times, it will be proper to reach lon. 37° E. before crossing the parallel of 34° or 35° S., or shaping a direct course for the channel. Caution in entering the Mozambique Channel.

It was the practice of most navigators to get a sight of Madagascar, near St. Augustine Bay, and then to steer a course along this side of the channel, to get soundings on the Pracel Bank, on which are several dangers, and the soundings mostly coral rock; and there are other dangerous spots in several places near this shore: it therefore appears, that the track near mid-channel is preferable when the longitude can be relied on; for here the winds are more steady, and no dangers except the Bassas da India and Europa Rocks, the parallels of which must be crossed with great caution particularly during the night. These may be passed either to the westward, or eastward; and when to the northward of them, a course should be steered to pass to the westward of the Island Juan de Nova, direct for Mohilla, or Comoro. Middle and in-shore passages compared.

Although the mid-channel track was seldom frequented, from a dread of the Bassas da India and Europa Rocks, it appears preferable to the route along the Madagascar shore, when the navigator is confident of his longitude; for many ships have been in great danger, by falling in unexpectedly with straggling islets or reefs near the coast of Madagascar. With a steady wind at South or S.S.W. the track to the westward of the Bassas da India and Europa Rocks seems preferable to that along the coast of Madagascar, it being clear of dangers. If a ship approach the African coast, she may be subject to light winds and southerly currents: but in mid-channel, the monsoon is generally strong, and more steady, than on either side of it; although in April, and early in May, the best winds will be found, by steering between Comoro and the African coast, rather to the westward of the mid-channel track.

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## COMORO ISLANDS, AND ADJACENT DANGERS.

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COMORO, the largest and highest of these four islands, gives its name to the others, which are Mohilla, Mayotta, and Johanna: they are all very high, and may be seen at the distance of from 14 to 20 leagues in clear weather. The inhabitants are Mahometans, descendants of Arabs incorporated with Africans, and at *present*, they are generally found to be courteous and hospitable.* Comoro Islands.

* The natives of Comoro appear not to have merited this character when the Company's ships first traded to India, for the Penelope had part of her crew enticed on shore, and destroyed by the inhabitants of this island.

Grand Comoro. Comoro, called also Angazecha, is about 12 leagues in length North and South, and about 5 or 6 leagues broad. The anchorage at this island is inconvenient, and water not easily procured; European ships, therefore, do not now visit it, though formerly they sometimes touched here for supplies.

Anchorage. The anchorage is at the N.W. part of the island, said to be in lat. 11° 18′ S., about $1\frac{1}{4}$ or $1\frac{1}{2}$ miles to the westward of Muchamahola, the King's Town, opposite to a small sandy beach, but it is not advisable for a ship to anchor under 30 or 35 fathoms water, for in this depth she will only be distant from the breakers about 2 cables' lengths.

This remark was given by Captain Webber, who was there in the Oxford, in 1759, and the bearings recommended for anchorage are, the easternmost point of land in sight East, King's Town, E.S.E. and the black rocky point S. by W. The Suffolk at anchor in 24 fathoms, sandy ground, had the King's Town E. $\frac{1}{2}$ S., distant near 2 miles, the easternmost land E. by N., and a black bluff point, like two rocky islands, S.S.W. Captain Mitcham says, a ship may anchor with the easternmost land in sight E. by N., and the black bluff point S. by W. $\frac{1}{2}$ W.; but these and the Suffolk's bearings are probably too close for a large ship.

Excepting the anchorage at the N.W. end, the island is generally steep, having no soundings at a small distance from the shore; there are, indeed, two small bays, called Ingando and Moroon, to the northward of the S.W. point, where the bottom is coral, and the depth 35 fathoms within a cable's length of the breakers, but no vessel should anchor there; more especially as a reef of breakers is said to extend from the S.W. part of the island to a considerable distance, with shoal coral patches beyond the breakers, upon which a ship returning from Bombay to England a few years ago, was nearly lost.

If a ship intend to anchor at this island, she ought to have the boats prepared to tow when it is approached, for she will be liable to baffling light airs and calms, the high land obstructing the regular monsoon, and the tides, which are strong, may be liable to drift her past the anchorage, if precaution is not taken to counteract their impulse.

The town is large, with many coco-nut trees, and a sandy beach before it; at low tide a boat cannot land, as shoal water extends 3 quarters of a mile from the town, which is the only landing place. Steering for the anchorage, a boat should be sent a-head to sound, for the bank is steep, and the distance small, from 35 fathoms on its outer edge, to 12 fathoms close to the breakers. Ships might be sheltered from the southerly monsoon, but it would be dangerous with strong N.W. winds, which however seldom happen, particularly during summer, when the southerly monsoon predominates. Supplies. Bullocks, sheep, goats, and tropical fruits are plentiful, but no water to be procured.

In 1759, the price of bullocks was settled by the king, from 4 to 6 dollars each; and it is prudent to give him a present when a supply is wanted.

Tides. High water at $4\frac{3}{4}$ hours, and the tides are strong and rise about 12 feet on the springs. The S.E. point of Comoro is by Capt. Owen in lat. 11° 54′ S., and lon. 43° 33′ E.

Mohilla. MOHILLA, at one time was considered, of all these islands, the best for obtaining refreshments; but the preference, for many years, has justly been given to Johanna, an account of the anchorage being safer than at any of the others. Mohilla is the smallest of these islands, distant about 6 leagues S.S.E. from Comoro, and about 5

leagues West of Johanna. The north point is in lat. 12° 36′ S., lon. 43° 50′ E., and the most elevated part is near the N.W. end, but it is not so high as Comoro or Johanna.

At the south end of the island, are several small isles,* with a coral reef around them, behind which Van Keulen describes good anchorage, with 8 or 9 fathoms least water, in crossing the coral reef to the eastward of these isles, where the ground is plainly seen, but no danger. The soundings within the reef, are said to be from 45 to 30 fathoms sandy bottom, where is the anchorage. There is also an anchoring place near the shore, at the north part of Mohilla, and one on the east side, where refreshments may be obtained. Anchorage.

Captain Wilson, of the Suffolk, who was at this island in May, 1756, at noon, observed the lat. 12° 29′ S., extremes of Mohilla bearing from E. ½ N. to N.N.E., distance from the islands off the S.W. part 5 miles, the high land of Comoro North. They passed these islands at the distance of 4 or 5 miles, and when clear of them, hauled in for the N.W. end of Mohilla; no ground with 40, 50, and 60 fathoms of line was obtained in rounding the island. About 2 miles short of the N.W. point of the island, there is a black rock always above water, which lies about 2 miles from the shore; in passing this about 2 miles distant, had no ground with 30 and 40 fathoms. The reef of rocks above water, which projects from the N.W. point of Mohilla about a quarter of a mile, was passed about the distance of 1½ miles, no ground 30 fathoms; when clear of the point, and the land opening to the eastward, hauled in for it, and soon got soundings 30 fathoms, small stones and coral, decreasing to 15 fathoms as the shore was approached. On edging off to 24 fathoms, a small town was seen on a bluff hillock, close to the sea. Having previously sent a boat to examine this place, stood in, with boats a-head sounding, and anchored at 6 P.M. in 24 fathoms, small stones, shells, and coral, then moored with the stream to the northward, in 26 fathoms, off shore 3 quarters of a mile, the N.W. point of Mohilla bore W.S.W., the easternmost extreme E. by S. ½ S., and the town S.S.W. Capt. Wilson's route to the anchorage.

The watering place at this town was found to be about 200 yards from the beach, up an easy ascent, but the run of water was in a ravine about 12 feet deep, which seemed to have been formed by the torrents from the hills; this was steep, which made it necessary to fill the casks with the engine; they were then rolled with great ease from the beach, which is soft sand. The run of water is clear, and constant from the mountains, but is lost among the rocks and sand, about 10 yards below the place where the casks were filled, and it was observed to issue from the beach afterwards at low water. A reef of rocks extends from the point on which the town is built, across the little bay where the watering place is, to two rocks to the eastward, which are always above water; this prevents boats working the last quarter ebb, and the first quarter flood, as the reef is dry at low water. High water at 6 hours at full and change of moon; the tide rises 15 feet, and sets along shore, the flood to the westward, but changes before the water has done rising, as does the stream to the eastward before it has done falling. Watering place. Tides.

Mr. Jackson, the second officer, was sent at day-light, 29th, in the pinnace to examine the coast to the eastward, between this place and the King's Town; he returned next day, and reported that the King's Town is about 4 leagues S.E. by S.; that the coast between it and where the ship lay is very dangerous, having several Mr. Jackson's examination of the coast.

* In the Company's ship, James Sibbald, Captain Forbes, December 18th, 1825, in passing Mohilla, a large Rock or Islet seen, appeared to be situated about 6 or 7 miles to the eastward of the body of the island.

reefs of rocks projecting far out into the sea; that a ship cannot lie nearer than 2 miles from the land off the King's Town; that there is a great surf on the shore, and that boats cannot go in after ebb. The watering place is a mile beyond the town, and not convenient, there being a chopping sea which prevented the boat's rowing. He landed, and walked about 4 miles farther along shore to the S.S.E., and came to a large run of water, like that of Johanna. The coast appeared very rocky, and being open to the S.E., a heavy swell came in, and the surf was great on the shore, which would, apparently, make it very difficult to water there.

Fruit was had in abundance where the Suffolk lay, but only 27 bullocks could be procured, and many of them small. She weighed June 4th, at mid-day, and the first cast after the anchor was up, was only 15 fathoms, deepening gradually to 40 fathoms, at the distance of about 5 miles from the shore, steering N.N.E. to N.E.; afterwards no ground.

Capt. Mitcham's description of the anchorage.

Captain Mitcham describes the anchorage on the east side of Mohilla to be in muddy ground, betwixt two reefs or shoals, when an islet or rock will bear S. by E. ½ E., the southernmost point S.E. by S., and the westernmost point in sight, low and flat, with some trees on it, and a reef of rocks dry at low water N.W. ½ N., distance 3 miles. The King's Town is near this point, but ships cannot anchor there, the ground being foul.

The Winchelsea, in 1762, anchored in 22 fathoms, on the north side of Mohilla, about half a mile to the eastward of a place where she watered; Johanna bore from E. 9° S. to E. 27° S., South part of Comoro N. ½ W. to N. 21° W. and Mohilla the N.N.E. point, called Coco-nut-tree Point, S.E. distant 4 or 5 miles, the N.N.W. point West, distant 3 miles; observed on shore at the watering place in lat. 12° 13½′ S. The bottom was rocky, as the cable was injured, and the hawser cut in two.

In 1749, the Warren, Captain Glover, lay some time within the isles which front the South part of Mohilla.

Mayotta.

MAYOTTA, the easternmost of the Comoro Islands, bears from Johanna about S.E., the breadth of the channel between them being about 10 leagues. On the South part of Mayotta, there is a sharp conical mountain called Valentine Peak, which makes it easily known. By selecting a number of observations made by different navigators, this Peak appears to be in lat. 12° 54′ S., lon. 45° 15′ E. The island extends S.S.E. and N.N.W., the southern extremity being in about lat. 13° 5′ S., and the N.W. part, where is the anchorage, in lat. 12° 42′ S. This island is completely surrounded by a coral reef, to the distance of 3, 4, and 5 miles in some places. There is, however, an opening in the reef at the north part of the island, leading to a place of anchorage, which has been visited by English ships in former times, when they wanted refreshments; or when this island happened to be mistaken for Johanna.

Anchorage.

Saddle Island.

A Saddle Island, like that of Johanna, is situated at the N.W. end of Mayotta, which is thought to have occasioned the mistake here mentioned; between Saddle Island and the reef to the eastward of it, is the channel which leads to the anchorage, having deep water in the east side, near the sunken reef; but, towards Saddle Island, there are only 5, 6, and 7 fathoms, on a spit projecting to the N.E. and Eastward. Within this island the depths are from 16 to 30 fathoms in proceeding to the anchorage near the town, which is about 4 or 5 miles South-eastward from the island, and abreast a bluff headland with rocks overhanging the sea. To the southward and S.W. of Saddle Island, reefs and breakers extend 4 and 5 miles from the shore.

The channel leading to the anchorage, at the N.W. end of Mayotta, is imperfectly known, not having been frequented by English ships these many years; therefore, any ship intending to touch there for refreshments should keep boats sounding a-head, until she reach the anchorage, which is in 26 and 28 fathoms, sandy bottom. It is high water on full and change, at $5\frac{3}{4}$ hours; the rise of tide 11 or 12 feet. Variation off Mayotta in 1824 was 12° 5′ W. *Channel leading to the anchorage.* *Tides.*

Ships are frequently liable to calms and light winds near these islands, particularly at the changes of the monsoons, when the currents are also variable. If carried to the eastward of Mayotta, at such times, by the current, take care to avoid a supposed reef, said to lie nearly 4 leagues off shore. When the north point of Mayotta bore N.W. by N. and the south point S.W. by W. 6 or 7 leagues, this reef bore N.W. by W. distant 2 leagues: it appears to have been seen by the Devonshire, 10th December, 1766, at 4 P.M., when Mayotta bore from S. by E. to W.S.W., the three small isles off its north end from W.S.W. to West, distant from the nearest shore 3 leagues, breakers were then seen from the mast-head bearing N.W. by N. *Winds and currents.* *Supposed reef.*

JOHANNA, or ANZUAN, is more frequented by European ships, than any other place of refreshment in the Mozambique Channel; it is higher than Mohilla or Mayotta, though not so much elevated as Comoro. The mountain called the Peak has not this appearance in every view, but it is rather of an oblong form; it is situated near the east part of the island. This Peak is in lat. 12° 15′ S., lon. 44° 34′ E. by mean of lunar observations, taken in ten different ships, at various times. The south extremity of the island is in about lat. 12° 25′ S., and the anchorage of the bay is on the north side, in lat. 12° $7\frac{1}{2}$′ S., lon. 44° 30′ E.* The island is of a triangular form, with rocky reefs extending from its extremities; and from the S.W. to the N.W. point, the shore is bounded by a reef, to the distance of 2 miles from it in many places. Ships, therefore, should not in light winds come too near the southern shore of this island, in case of a calm ensuing, and the current or swell drifting them on the reef;† but they ought to steer direct to the N.W. point, near which is a small island, from its form called Saddle Island, connected with the main island by the reef already described, which surrounds the island to a considerable distance. This island should not be passed nearer than 2 miles, as the foul rocky ground extends from it about a mile on the north and 2 miles on the west side, and is steep to, having no soundings with 20 fathoms close to its outer edge. If a ship happen to pass too near, and have soundings on the verge of the foul ground off Saddle Island, she ought to edge away to the northward immediately; for it is dangerous to make free with this foul ground or reef, there being great overfalls and shoal water on its outer verge; and farther in, it is nearly dry at low water spring tides. When past Saddle Island, which is the western boundary of the large bay on the north side of Johanna, she should steer along to the anchorage, hauling up gradually for the shore, on account of the reef which extends from Saddle Island about 4 miles along shore to the eastward, and the shoal water on it is generally visible. When thus far advanced, the sudden gusts, which often blow from the hills, make it prudent to keep in with the land in sailing to the anchoring place, which is about 3 or 4 miles to the westward of the town, abreast a range of coco-nut trees, *Johanna Island.* *Of approaching the anchorage.*

* Captain Owen makes the town in lon. 44° 27′ E.; or 3° 40′ East of Mozambique Flagstaff, and 26° 1′ East from the Devil's Mount at Table Bay, Cape of Good Hope.

† The Brilliant, in 1782, drifted towards the shore, and was wrecked on the reef, at the S.W. part of the island; and several other ships, only by great exertion, have been towed clear of it by their boats, when becalmed near the S.W. side of this island.

near the sea, called Brown's Gardens; and having a large black rock to the eastward betwixt them and the town. The rivulet where the water is procured is at the western extremity of Brown's Gardens.

Capt. Moffat's directions.

Captain Moffat, who in 1814 made a survey of the bay of Johanna, says—care should be taken not to make too free with the shore, after luffing round Saddle Island. It may be approached very close in some parts, but a distance of $1\frac{1}{2}$ miles is sufficiently near to *venture*, for in several places coral rocks extend out to a considerable distance. This is the case to the eastward of the Black Rock, also to the westward of the fort. Be on your guard, by having your ship under proper sail for working, as flurries of wind often blow from the land; and when you approach near the Black Rock, luff in if you can, and get soundings, and be ready to tack if you cannot fetch into the anchorage. Keep the deep sea-lead going, when standing towards the shore, with the hand-lead also ready. Have the boats ready to tow, in case it should fall calm, as they may often be found very useful.

Best anchorage.

The most convenient berth for mooring is abreast the rivulet bearing S. by W., with the Peak S. by E. $\frac{1}{2}$ E., the Mosque East, and the extremes of the bay N.E. Easterly to N.W. by W.* In this situation, with the inner anchor in 10 fathoms, a ship will be a quarter of a mile or more from the shore at low water, and a line of light cordage may be extended from the ship to a small anchor or grapnel near the shore, to conduct the boats on board with water, and they may haul off to the anchor by a rope placed from it to the shore. The anchorage here is good holding ground. There is another watering place, with good anchorage off it, some distance to the westward of the Black Rock, and Brown's Gardens; and a third watering place, near mid-way between the Black Rock and the town. There is also a fourth place, where the water comes through the first coco-nut tope to the eastward of the town, but the anchorage before the town being very indifferent, it is not frequented; for here, with the outer anchor in 25 fathoms, and the other in 7 fathoms, a ship will not be distant from the shore above 2 cables' lengths at low water.

Watering places.

Reefs.

Between Brown's Gardens and the Mosque Town there is a reef of rocks projecting from the shore near a quarter of a mile, dry at low water. Having anchored at high water, a ship may appear to be at a proper distance from the shore; but the declivity from the beach at this part being very gradual, and the rise of tide considerable, she may at low water, when the rocks appear, be found to have anchored very near them; the best berth is, therefore, abreast the proper watering place, already mentioned. High water at $3\frac{1}{2}$ hours on full and change; the rise $8\frac{1}{2}$ feet perpendicular. Variation 13° 45′ W. in 1822.

Tides.

Reef.

At the eastern extremity of the bay, a reef of sand and coral lines the shore along the N.E. part of the island, having deep water on its outer edge.

Water and other refreshments.

The water at Johanna is excellent, but wood is a scarce article. The bullocks are small, weighing 300 or 350lbs. each, but the meat is good. Goats, kids, and poultry, may also be procured at high prices. On the whole, this is a proper place for obtaining refreshments, or restoring to health a scorbutic crew, for the island abounds with coco-nuts, limes, oranges, plantains, and other tropical fruits; yams and sweet potatoes, may also be procured.

Caution.

As the wind blows from the hills and valleys in variable gusts, it is prudent to bring a ship under proper sail on approaching Saddle Island, for hauling close to the wind, or for tacking, should that be requisite before she reach the anchorage.

* The Cirencester, abreast the watering place, at anchor in 16 fathoms, had the extremes of the Bay from N.E. $\frac{1}{2}$ N. to Saddle Island W.N.W., and the town E. $\frac{1}{2}$ N., off shore $\frac{1}{2}$ a mile.

The natives are hospitable, but they possess a considerable degree of low cunning, and some of them are addicted to theft. Character of the Natives.

In November the weather is precarious; heavy rains are then expected, with the changing of the monsoon, which generally happens about the middle of the month; the northerly monsoon then commencing, it is considered not perfectly safe to remain in Johanna Road during these northerly winds, at times liable to blow strong. The currents are variable about this island, particularly at change of the monsoons, but their general course is to the S. Westward. Weather. Currents.

THE DANGERS *probably* existing in the vicinity of the Comoro Islands are the following:—

FIREBRASS SHOALS, seen by the ship of this name in 1682, and by the Devonshire in 1766, were lately considered doubtful; but their existence has been ascertained in the barque Rover, southern whaler, and the following description is given by Mr. Butcher, of that vessel: "April 21st, 1831, at 1½ P.M. discovered a large and dangerous shoal, in lat. 12° 22′ S., lon. 46° 20′ E., extending E.S.E. and W.N.W. about 10 miles, 4 or 5 miles of which dries at half ebb, and the other parts are conspicuous with high breakers. When the centre of the shoals bore N. by E. ½ E. distant about 2 leagues, had soundings of 12 to 8 fathoms rocks and sand. From hence steered to the W.S.W., and on making Mayotta, found the observations for longitude by means of lunars and chronometer were correct." The Borneo whaler was lost 22nd July, 1832, by striking on a coral shoal, said to be in lat. 12° 17′ S., lon. 46° E., which was probably one of the Firebrass shoals. Firebrass shoals.

LEVEN BANK, of soundings of various depths, *apparently* not dangerous, discovered by Captain Owen in his survey of these seas, extends from lat. 12° 21′ to 12° 44′ S., and from lon. 47° 46′ to 47° 57′ E.; and another bank, in lat. 12° 24′ S., lon. 48° 25′ E., was discovered between the former and the coast of Madagascar. Leven Bank.

Ships passing to the eastward of Mayotta ought to proceed with much circumspection, as there may possibly exist other banks or dangers, not yet discovered.

Near Grand Comoro, a shoal or bank is placed by the Portuguese distant 3 leagues from the S.W. point of Comoro; it is said to be 5 or 6 leagues long, N.W. and S.E., having 6 fathoms on the south part, and 4 fathoms on the N.W. part, at half flood. Doubtful shoals.

A reef of breakers, about 8 or 10 leagues to the westward of Comoro, is said to have been seen in the Devonshire, in 1764, and appeared to extend N.E. and S.W. about 2 miles in length.

These seem to be very doubtful, as many ships have passed to the westward of Comoro without perceiving any appearance of danger.

ST. LAZARUS BANK, in about lat. 12° S., said to be 12 or 14 leagues to the eastward of the Querimba Islands, is very little known, although several ships have sounded on it. The Dorset had soundings of 12 to 18 fathoms on it in 1737, in lat. 11° 56′ S., and 1° 10′ E. from the main, and the south part seemed very shoal. The Edgecote had 10 and 12 fathoms on it in 1757, in lat. 12° 4′ S., and 1° 12′ E. from Querimba; and the Raymond, in 1784, in lat. 12° 13′ S., about 33 miles East from Cape Delgado, had soundings on it. The soundings obtained on it by these ships, seem to have been from 9 to 50 fathoms; but the extent of this bank, its real distance St. Lazarus Bank.

from the adjacent coast, and from Comoro, and whether or not any part of it is dangerous, remain imperfectly ascertained.

The Portuguese describe it to be dangerous. The Kaunitz, Imperial ship, in 1791, is said to have seen breakers from the quarter-deck bearing East, distant about 3 leagues, when the land was visible to the westward, about 11 leagues' distance: Mr. Osborn, 1st officer, made this shoal in lon. 42° 25′ E. by lunar observation, and it is said to be in lat. 11° 3′ S.; although this does not agree with the latitude assigned to St. Lazarus Bank, they are considered by some as the same shoal.

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# FROM THE COMORO ISLANDS, TOWARDS INDIA.

## DANGERS—PASSAGES OF SHIPS, SHEWING WINDS AND CURRENTS—DIRECTIONS.

### DANGERS.

In addition to the dangers of the Seychelle and Amirante Islands, and those to the northward of Madagascar, already described, the following, although doubtful, should be noticed.

Bassas de Patram, doubtful.

BASSAS DE PATRAM is a doubtful shoal, there being no satisfactory account concerning it, unless that given by Captain Wilson, of the Pitt, may be considered as such. His journal states, August 16th, 1758, that breakers were seen from the mast-head, bearing from E. by N., to E.N.E., distant 5 leagues, supposed to be the Bassas de Patram. He made them in lat. 4° 30′ S., and 50 miles East of Comoro *by account*.

Bassas de Ambre, doubtful.

BASSAS DE AMBRE, thought to have been seen in H.M. ships Norfolk and Panther, May 17th, 1760, on their passage from Johanna towards India: the sand was visible in several places, and the bank appeared about 9 miles in extent. They made 5° 49′ mer. distance East from Johanna, and the lat. about 0° 9′ S. It is sometimes placed in 51° 50′ E., whereas, the run of these ships from Johanna would place it in about lon. 50° 30′ E. The Huddart, in August, 1803, saw what *appeared* to be broken water, which they supposed might be the Ambre Shoal, lat. 0° 5′ S., lon. by chron. 48° 50′ E. But neither this, nor Bassas de Patram, are now believed to exist.

### PASSAGES OF SHIPS, SHEWING WINDS AND CURRENTS.

The Essex, from Johanna to Bombay.

THE ESSEX, bound to Bombay, got the winds from the northward 15th Sept., 1791, and reached Johanna the 28th. She left this island October 3rd, and the day following was drifted by the current to the westward of Comoro, almost close to the

rocks, during the night, when calm; the current, which swept round a point of the island, was then deflected by the bluff rocky shore, and she had no soundings, although the boat lay upon a rock where the water was shoal, at a small distance in shore. From hence she had S.E. winds to the equator, and crossed it on the 15th; S.W. and westerly winds then prevailed till in lat. 6° N.: winds from N. N.W. followed till in lat. 10° N. on the 27th; she had afterwards N. N. E. and northerly winds until her arrival at Bombay, 17th November.

H. M. S. LEOPARD, Commodore Blankett, bound to the Red Sea, anchored at Johanna, October 29th, 1798; and the Dædalus saw the Island of Mayotta on the same day, but did not reach Johanna Road till the 5th November, owing to light winds and southerly currents. They sailed on the 11th, had light variable winds, made the coast of Africa on the 24th, in lat. 0° 44′ N.; the current began to run strong to the southward along the coast, sometimes more than 2 miles an hour, during the time they continued to beat against it and the north-easterly winds, until the 14th February, 1799, without gaining ground. During this period, they were generally within 30 miles on either side the equator, and kept near the shore. Provisions began to fail, and the Dædalus was dispatched, 14th January, to the Cape of Good Hope, after transporting most part of her provisions to the Leopard. This ship, with the Orestes sloop in company, continued to beat without effect till the 14th February, when they bore away for Zanzibar to procure provisions and refreshments, and arrived there on the 20th. They sailed again on the 5th of March, coasted along to the northward, and had now the current generally favourable, but the wind often contrary. Continuing to coast along shore, they passed Cape Guardafui, (Ras Jar d'Afoon) April 8th, and anchored the 11th, in Aden Road.

The Leopard and Dædalus, from Comoro Islands to the Red Sea.

His Majesty's ship Imogene, Captain Hart, left Zanzibar, February 7th, 1834, kept near the equator, crossed it in lon. 58° E., stood then to the northward till near Socotra, March 12th, and reached Bombay on the 29th, with continued N. E. and N.N.E. winds.

Route of H.M.S. Imogene.

THE ASCENSION was close to the Comoro Islands, late in October, 1608, and had stormy weather in the southern part of the Mozambique Channel; she touched at the Island Pemba on the African coast to obtain refreshments, but was obliged to leave it in consequence of the perfidy of the natives, who at first appeared friendly, but afterwards enticed some of the crew on shore, and then assaulted them. After leaving this place, she continued to beat at sea until she fell in with a group of uninhabited islands,* abounding with coco-nuts, and other refreshments. The contrary winds continued till late in March, which prevented her reaching Aden Road before April.†

The Ascension, from Comoro Islands to Aden.

THE MARY, Captain Oyles, from England, bound to the Gulf of Persia, left Table Bay, Cape of Good Hope, 15th August, 1694, saw the coast of Natal in lat. 29½° S., the 7th September, having experienced a current of 180 leagues to the westward from

The Mary, from Cape of Good Hope to Persian Gulf.

* Probably some of those in the Seychelle Archipelago.

† Captain Saris, with the Clove, Hector, and Thomas, left Mohilla in November, 1611, made the coast of Melinda in December, and were carried back to 5° S. by the currents. They made Cape Bassas, January 1st, 1612, had strong easterly winds here, and southerly currents; but more to the southward, light airs and strong ripplings when they stood out to seaward. From Cape Orfui, which they made early in February, they stood out to sea, and saw it again 8 days after, owing to westerly currents, and arrived at Tamarida Road, in the Island Socotra, having a passage of 14 weeks from Mohilla, against the monsoon. These ships made a passage by keeping mostly out from land, while the Leopard could not effect it along the coast.

leaving Table Bay. She had light winds and southerly currents in the Mozambique Channel, watered at Johanna, sailed from thence on the 4th November, had variable light winds and calms, passed between the African Isles and those of the S.W. part of the Seychelle Archipelago on the 6th December, then stood to the eastward on the south side of the island of Mahé and those near it; left the eastern edge of the bank on the 21st Dec. and steered East and N. E. for a few days with variable winds between North and S.W., which veered to N. E. and East when near the equator; steered then between N. N. E. and N. N. W., making a tack to the eastward at times. Saw the east end of Socotra on the 16th January, 1695, having experienced 140 leagues of westerly current since leaving Johanna; saw the coast of Arabia near Cape Chansley on the 20th, had here land and sea winds from N. E. to S. E., which drew to the southward when off Cape Isolette, with which, rounded the Island Mazeira on the 30th, made an occasional tack at times, passed Ras-el-had 1st February, and arrived 18th at Gombroon.

Conclusions from the foregoing passages.

These ships being late in the season, ought to have avoided the Mozambique Channel and the African coast. Had they proceeded to the eastward of the Madagascar, and between Diego Garcia and the Seychelle Islands, the Essex would probably have reached Bombay more speedily; and the others destined for Aden and the Red Sea, by following the same route, then keeping within a few degrees of the western limit of the Maldiva Islands until they had reached lat. 6° or 7° N., and met with N. N. Easterly winds, there is reason to think their passage would not have been very tedious.

DIRECTIONS.

Mozambique Channel not proper after September.

WHETHER BOUND TO THE RED SEA, the Persian Gulf, or to India, it seems improper to proceed through the Mozambique Channel after September, on account of light baffling winds and strong S.W. and southerly currents, which frequently prevail in October and November among the Comoro Islands.

From Comoro Islands, toward India.

From Johanna, towards India, a course about N.N.E. is proper to the parallel of lat. 8° S.; to avoid falling in with the Aldabra Islands, and in crossing their latitude, a good look-out is requisite. From the parallel of 8° S. a course more easterly ought to be steered, to cross the equator in lon. 53° or 54° E., taking care to avoid Alphonse Island near the parallel of 7° S., and the African Islands near the parallel of 5° S. By crossing the equator well to the eastward, the position assigned to the Ambre Shoal will be avoided.

In running from the Comoro Islands to the equator, during the southerly monsoon, the winds generally prevail at S. S. Eastward, increasing in strength as the latitude is decreased; and they veer to S. S.W. and S.W. in North latitude.

From the Equator towards Bombay.

From the equator, a ship bound to Bombay may steer a direct course for that place, taking care to get on the parallel of the Island of Kanary, at a considerable distance from the coast, and then steer directly East for it. In steering East for the entrance of Bombay Harbour, the soundings denote the approach to the land. On the parallel of Kanary, at the distance of 40 leagues to the westward, the depths are from 52 to 60 fathoms; at 20 leagues' distance, 46 and 48 fathoms; at 10 leagues' distance, 36 or 37 fathoms; and 5 leagues West from it, 19 or 20 fathoms.

At the conclusion of the southerly monsoon, a ship leaving the Comoro Islands should steer more easterly than during the strength of the southerly winds, to counteract the prevailing westerly currents.

If bound from the Mozambique Channel, or from Mauritius, to the southern part of

the Malabar Coast, or to Colombo, near the close of the S.W. monsoon, a ship may steer a course from the equator to pass through the Eight or Nine Degrees Channel; but if bound to the south part of Ceylon, or the Coromandel Coast, the One-and-a-Half Degree Channel seems preferable, being more direct, and equally safe as the former. From Mozambique Channel or Mauritius, to South part of Malabar Coast or to Ceylon.

In passing through the Nine Degree Channel in thick weather, and uncertain of the exact latitude, if the Island Minicoy is seen, pass on either side, as seems most expedient; but great caution is requisite in approaching any of these islands in thick weather, or in light winds, for they are all very low, with extensive coral reefs contiguous to them; close to which, there are no soundings.

If this channel is adopted when bound to the Coromandel Coast, and certain of being to the eastward of Minicoy, a direct course may be steered for Point de Galle: if uncertain of the longitude, steer to the eastward, until soundings are obtained on the bank adjacent to Cape Comorin, any where between lat. 8° 4′ N., and 9° N. The depths are from 45 to 50 fathoms 8 or 9 leagues off the coast, at which distance the high land will be easily seen in clear weather; but the weather being generally hazy during the S.W. monsoon, the land is seldom visible until near it; a course, therefore, must be steered to the southward, when soundings are obtained. In steering from Cape Comorin for Point de Galle, a course should be adopted to place a ship in the latitude of the latter, at a reasonable distance from it, for the current at times sets into the Gulf of Manar; and near Point de Galle, the wind is sometimes at S.S.W., which might cause considerable delay, were a ship not able to clear the S.W. extremity of Ceylon with that wind.* If the position be correctly known by lunar observations or chronometers, or any of the islands be seen in passing through either the Eight Degree or Nine Degree Channel, there will be no cause to steer for soundings off Cape Comorin, but a direct course may be pursued for Point de Galle.

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## SOUTH COAST OF AFRICA, FROM CAPE AGULHAS TO ALGOA BAY.

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THE BAYS ON THE SOUTH COAST OF AFRICA are mostly open to S.E. and Easterly winds, seldom visited by large ships, except in exigent cases; but small vessels from the Cape frequent several of these bays, to procure timber and grain. Bays of South Africa.

From Cape Agulhas, Cape Infanta bears about East, distant about 15 or 16 leagues; the coast between them is low, and sandy in some places near the sea, extending from

* About a century ago, several ships from England, bound to Madras, got into the Gulf of Manar by errors in their reckoning, in the strength of the S.W. monsoon; but their journals shew, that by making a few tacks, they all got round Ceylon without difficulty.

Struys Bay. the former Cape, in a circular direction to N. Eastward, by which Struys Bay is formed to the eastward of that cape; being open to easterly and southerly winds, and the coast around sterile, this bay ought never to be voluntarily entered by any ship, as is shewn in the section, where the Cape and Bank of Agulhas are described.

St. Sebastian Bay. ST. SEBASTIAN BAY is formed on the north side of Cape Infanta, the land turning sharp round from this cape to the N.W. The Bay is open to southerly and easterly winds, and not frequented: it has deep water near its shores, and seems clear of danger; about two leagues off shore, the depths are 36 and 38 fathoms. At the bottom of the bay, to the N.W. of Cape Infanta, there is a valley between the mountains, through which Infanta River descends to the sea, and there is said to be good anchorage off the entrance of the river, where a ship might be sheltered from N.W. and westerly winds, but there is generally a considerable swell tumbling into the bay. Cape Infanta. Cape Infanta, the southern extreme of St. Sebastian Bay, is of middling height, with sand downs over it, having an arid appearance; and it is in lat. 34° 31′ S., lon. 20° 53′ E. by Capt. Owen's survey, and in lat. 34° 34′ S., lon. 20° 51′ E., by Mr. Walker of H.M. brig Dispatch. To the northward of the Bay of St. Sebastian, there is a flat table hill, and further to the N. Eastward, a mountain with a hummock on it, resembling a cupola. Point Leven. Point Leven, named by Captain Owen, is a projecting part of the coast, in lat. 34° 27$\frac{1}{3}$′ S., lon. 21° 25′ E.

From St. Sebastian Bay, the coast extends about E. by N. *true* bearing to Cape Vaches in lat. 34° 20′ S., lon. 21° 56′ E., the distance between them being about 23 leagues: in this space, the coast is high, and regular.

Flesh Bay. FLESH BAY, on the N. E. side of Cape Vaches, was sometimes entered by the early Dutch navigators, for water, bullocks, and other supplies: there is said to be a reef projecting a little way from Cape Vaches, and an island near the Fish Bay. shore at the bottom of the bay. FISH BAY lies to the N.N. Eastward of the bay last mentioned, between it and Cape St. Blaize, which cape separates it from Mossel Bay.

Mossel Bay. MOSSEL BAY, formerly the Bay of St. Blaize, or St. Bras, is bounded to the southward by Cape St. Blaize, in lat. 34° 7′ S., lon. 22° 12′ E., 6 or 7 leagues northeastward from Cape Vaches. Capt. Foster, of H.M.S. Chanticleer, made Mossel Cape St. Blaize reef. Bay anchorage, in lat. 34° 10′ 17″ S. There is a reef off Cape St. Blaize, a little less than half a mile to the S. Eastward, on which the sea generally breaks; it is steep to, on the outside, and between it and the cape there is a narrow channel, with 5 fathoms water. The western reddish bluff, kept open of the craggy point (which is about 3 quarters of a mile to the westward of the cape), bearing W. by N. $\frac{1}{4}$ N., will lead a ship about half or 3 quarters of a cable's length clear of the reef in 16 or 18 fathoms, and when the cape bluff is brought to bear W.N.W., she may haul directly into the bay, and Anchorage. anchor in any situation thought convenient, the soundings being regular over a sandy bottom.

Seal Island is near the shore in the West side of the bay; when it bears N.W. by W., the corn magazine (a long white stone building) S.W. by S., and the outer point South, a ship will have a good berth in 7$\frac{1}{2}$ fathoms water, distant from the shore nearly 1 mile.

Mossel Bay is open to the wind from South to East, and when blowing fresh from

these points, a great swell rolls in ; the S.E. gales seldom blow more than 24 hours at a time, and generally moderate in the evening.

Water may be conveniently got near the landing place, which is on a sandy beach, at cove or small bay, near Point Holders. There is another small bay about 3 quarters of a mile to the S.E. of it, where the landing is most convenient when there is a great swell. Water and Supplies.

Several brackish rivers fall into this bay, none of which will admit a boat. Near the shore, brush-wood is only to be had, but a little way up the Great Brack River, there is plenty of large timber; and the new settlement of George Town is on the bank of this river, about 7 or 8 leagues to the N. Eastward of Mossel Bay.

Beef and mutton may be procured at moderate prices, but vegetables and fruits are scarce. Fish are plentiful near Seal Island, and oysters may be got on the rocks and reefs about the Cape.

High water at 3 hours on full and change of the moon, and the rise of tide is 6 feet perpendicular. Variation 27° 54′ W. in 1797. Tides.

From Mossel Bay to Seal Cape, or Cape Delgado, the distance is about 23 or 24 leagues; the coast between them lies nearly *true* East and West, extending a little to the southward of the parallel of lat. 34° South. It is a bold coast, the land generally of moderate height near the sea, and mountainous inland. Coast to Cape Delgado.

KNYSNA RIVER, in lat. 34° 6′ S., lon. 23° 8′ E. (east point of the entrance by Captain Owen), situated about 20 miles to the westward of the entrance of Plettenberg Bay, is formed between two perpendicular rocky headlands, and it looks like the entrance of a large dock, when viewed from seaward. Knysna River.

His Majesty's sloop Podargus, Captain Wallis, went into it in April, 1817. Capt. Wallis observes, that any vessel drawing under 15 feet, attending to the tide, might run for this river with safety, it being 288 yards wide at the only dangerous part. It is high water at full and change of the moon at 3 hours 45 minutes: extraordinary tides rise 7 feet, ordinary tides 5 and 6 feet, and the ebb tide runs out at the rate of 3 or 3½ miles an hour on the springs. The middle of the channel is the deepest water, but it is proper to keep nearest to the western head, on account of the straggling rocks lining the opposite side, which are mostly visible, excepting the Emu Rock, nearly half channel over, on the east side of the entrance, and about a cable's length S.W. of Inner Obelisk Point, above which is the signal station. It is just outside the northernmost of the straggling rocky islets before mentioned. The brig Emu was lost on this rock before its position was known. A pilot will come off by making the signal, and a boat should be ready with a line to run out to the rocks, in order to steady the vessel, in case of falling calm under the high land, and being obliged to anchor in the narrow part of the entrance. There is good anchorage outside, the depths decreasing gradually towards the entrance of the river, which affords room inside for about thirty sail of ships and is as smooth as a dock; and if necessary, a ship may be hove down to the steep bank, where vessels may also be built, forests of fine timber being contiguous to the river. Nevertheless, this place ought not to be attempted except in favourable weather, and never in a large ship. Capt. Wallis' account. Tides. Anchorage.

Mr. Walker, of H.M.S. Dispatch, made a stay of twenty days in this river in October, 1817, and speaks of it as "without doubt the best harbour in the colony." He afterwards made a survey of it, which has been published by the Admiralty, and in which he gives the following Pilot Signals made at the Flag Staff. Mr. Walker's account.

| | | |
|---|---|---|
| Flag—white and blue diagonally.................. | signifies | A pilot-boat is coming out. |
| Flag—red.............................................. | ... | Ship recommended not to attempt to come in. |
| Flag—white and red horizontally .............. | ... | Ship may come in now. If waiting for the tide, a Red Pendant will be shewn over the Flag at a proper time for entering. |
| Flag—yellow and blue vertically .................. | ... | Pilot-boat cannot go out, but a pilot is ready to receive the ship within the bar. |

Plettenberg Bay.

PLETTENBERG BAY, is formed by the projecting peninsula, called Seal Cape, or Cape Delgado, which is the southern extreme, and may be easily known by a gap in the land, about a mile to the westward of Seal Hill, which gives the Cape the appearance of an island when viewed from the southward at a few leagues' distance. Seal Cape is in lat. 34° 5′ S., lon. 23° 22′ E.

Whale Reef.

The only danger in approaching the bay is the Whale Reef, a circular shoal of rocks, bearing S.E. by E. from the Cape, near 1 mile distant; the sea in general breaks over it very high, and between it and the Cape there is a channel, in breadth about 3 quarters of a cable's length, with 7 fathoms, the least water. This channel should not be attempted but in case of necessity, as there is generally a great swell, and when it blows strong, the wind is unsettled and baffling near the Cape. By giving the Cape point a berth of a little more than a mile, ships may pass safely to the southward, and round the east side of the Whale, which is steep, having 18 fathoms water about a quarter of a cable's length from it; and when the south end of the long sandy beach is open with the high rocky point on the north side of Seal Hill, they will be to the northward of the shoal, and if the wind permit, may haul close into the bay.

Anchorage.

The common anchorage is in 17 or 18 fathoms water, about 3 quarters of a mile from the governor's store-houses, bearing from them S. by E. $\frac{3}{4}$ E., which is convenient for taking in timber; but by bringing the Cape to bear S. by E. $\frac{1}{2}$ E. and the gap S.W., a ship will be in $8\frac{3}{4}$ or 9 fathoms water, good ground, and more sheltered.

The bay is sheltered from all winds, except those at S.E. and Eastward. The wind from E.S.E. to S.S.W. sets in a great swell, but S. Easterly gales are of short duration here, as at Mossel Bay. The landing place is on a sandy beach, near the governor's store-houses, at the south end of which there is a small river, that descends from a farm at the distance of $1\frac{1}{4}$ miles, but the entrance is generally closed with a dry sandy bar. At both ends of the beach rocky points project, and from the south point E.S.E., 1 cable's length, are some rocks, dry at low water, which break off the sea.

Water and Supplies.

Wood may be cut near the landing place; watering is difficult, as the casks must be rolled near 300 yards over a heavy sand, and then rafted through the surf, which frequently runs high. Beef and poultry may be had at reasonable prices; vegetables are scarce; fish are plentiful near the cape and about the rocks off the landing place. Vessels from the cape load timber at this bay: for 12 miles to the N.W. of the landing place there is a forest, where various sorts of timber may be had; some of large dimensions, proper for either house or ship building.

Tides.

The tide flows to 3h. 10m. on full and change of moon, and rises 5 or 6 feet perpendicular; a strong current at times sets out of the bay, between the cape and the Whale. Several brackish rivers fall into the north side of this bay. Around Plettenberg Bay the land is hilly; inland, to the northward, there is a mountain, of an irregular shape, called Buffalo Mountain, the highest part of which is to the eastward;

Mountains near the coast.

about a degree to the eastward of Buffalo Mountain there is, inland, another, of a sharp conical form, called Peaked Mountain; 9 leagues farther eastward there is a table hill,

called Flat Mountain; and between these a round hill, called Round Mountain, or Grenadier's Cap: all these are at a considerable distance from the sea.

From Plettenberg Bay, the coast diverges a little southward from the *true* East point, to the distance of 30 leagues, being generally of middling height near the sea, and destitute of any places of shelter, the depth 60 fathoms about 5 leagues off shore.

ST. FRANCIS BAY, called also (Kromme) Crooked River Bay, has formerly been visited by some ships in distress. The Pigot got water and other refreshments here in June, 1785; and the Countess of Sutherland remained in it (after losing her masts at sea) from July 18th to August 17th, 1801; while she continued at this place, had frequent land and sea breezes, with strong winds, at times, from S.E., blowing into the bay, rendering her situation very dangerous, for the cables were much injured, and some of the anchors were broken by the rocks, although she moved from 10 fathoms on the east side to 7 fathoms on the west side of the bay, to endeavour to get better anchorage. A little to the eastward of the entrance of the river, the Pigot found a spot of 7 fathoms, sandy bottom, where she moored at a little more than a mile from the shore, the eastern extremity of the land in sight, bearing E. 10° N. *true* bearing, and a round mount in one with the entrance of the river, which is the best situation to moor. St. Francis Bay. Anchorage.

Crooked River is the only landing place, and that not always practicable, on account of the high surf; the most water on the bar is 7 or 8 feet at high spring tides, which flow at 5¼ hours on full and change of moon, and rise 5 or 6 feet. In the river the water is brackish, but, about a mile up, there is a spring on the larboard shore. A boat should be anchored outside the surf, and the casks hauled through it by ropes, when filled and brought down the river. Crooked River. Tides.

The Countess of Sutherland had her long-boat stove, which was hauled on shore to repair, but she became buried in the sand, and could not be extricated.

Bullocks and other refreshments may be procured in this bay, which abounds with fish. It is much exposed to southerly and easterly winds, and the ground being generally rocky, it ought not to be chosen as a place of refreshment, except in a case of necessity. Cape St. Francis, the S.W. point of the bay, is in lat. 34° 10′ S., lon. 24° 53′ E., by Capt. Owen's survey: a reef of high breakers projects to a considerable distance from the cape, with deep water close to it; and, although it is called the Cape of Mountains by the French, it is not high land; but on the same meridian, about 7 or 8 leagues inland, there is a remarkable rugged piece of high land, the flat and round mountains already mentioned, being 12 or 14 leagues to the westward of the bay. Supplies.

From Crooked River Bay, the coast lies nearly in the direction of *true* East, to the distance of 8 or 9 leagues, to Zeepard Point, in lat. 34° 4′ S., lon. 25° 29′ E., then bending to the northward of East, 4 or 5 leagues farther, forms Cape Recif, or Arrecife, the southern extremity of Algoa Bay; on this part of the coast, there are 60 fathoms water within two leagues of the shore in some places. Coast to the eastward.

RIY SHOAL (very doubtful), is stated by Capt. Riy, of the ship Cragievir, to bear S. 48° E., by compass from Lady Donkin's Monument at Port Elizabeth, distant about 6 leagues, and 5 or 6 miles S. Eastward from Cape Recif; he says, it is well known to the fishermen and coasters about Algoa Bay, and that the sea breaks on it in bad weather. If there be a shoal near the position here described, the Company's ship William Pitt, and all on board probably, perished on it, in the night of the 18th Decem- Riy Shoal.

ber, 1813; but it is hardly credible that a dangerous shoal can exist in this place, without being often seen by the ships which pass near Cape Recif.

Algoa Bay.

ALGOA, or ZWARTKOP, BAY is very extensive; but, as far as our present information leads us to judge, it is only in the western part of it, to the northward of Cape Recif, or in its N. Eastern part under the Isles St. Croix, that ships may anchor and find shelter. Algoa Bay being the only bay in which a distressed ship could find shelter from the violent N.W. gales, which prevail on the Agulhas Bank,* independent of other considerations, renders an accurate survey of the bay imperative; and until some such survey is made, much caution should be used in entering the bay, on account of the conflicting reports of its dangers. The care bestowed by Mr. Walker, of the Dispatch, and by Capt. Hunn, of the Redwing, in their examination of those rocks which now bear the names of their respective ships, leaves no room to doubt the accuracy of their positions; but the discrepancies in the bearings and estimated distances of these dangers from the points and islands of the bay, as stated by other authorities, give reason to believe that some other danger exists 2 or 3 miles outside the Dispatch Rock, which by mistake has been described under its name. This supposition is strengthened by the circumstance of Capt. Hunn having distinctly seen breakers during a gale, 5 or 6 miles, in an E.S.E. direction, from Redwing Rock, and by the report of the inhabitants to him, that a danger did exist there, although Capt. Hunn was unsuccessful in his subsequent search for it.

Caution necessary on entering the bay.

Cape Recif.

Cape Recif (Rocky Cape) is in lat. 34° 2′ S., lon. 25° 42′ E., by good observations; it is low and sandy, with a small conical hill near the extremity, not perceived unless close in shore, having several rocks, above water, adjacent, and reefs projecting to the southward and S.W., to the distance of 1½ miles from the shore, on which the sea generally breaks high, when there is much swell. This place is not easily known, although the Islands St. Croix lie in the north part of the bay, about 4 leagues distant from the cape; for they resemble small sandy hummocks on the main, not discernible in coming from the westward, unless close in with the shore; the highest of them appears like a saddle.

St. Croix Islands.

Directions.

Coming from the westward, a ship ought to pass round Cape Recif, at the distance of 3 or 4 miles, until it is brought to bear W. by N. or West; she may then haul in, and keep within a mile (or less) of the shore, to the next rocky point 4 miles distant from Cape Recif, called Beacon, or Rocky Point, carrying from 9 to 12 fathoms, the course being N. ½ E. A sunken rock, called Dispatch Rock, with only 6 feet water on it, bears E. by S. or E. ¾ S. from the rocky point about 3 miles, and 4 or 5 miles N. by E. from Cape Recif; as this rock is a small pinnacle, upon which the sea does not break in fine weather, large ships must give it a proper berth, keeping 3½ or 4 miles from Beacon Point, in passing outside; although a ship may occasionally use the channel inside of the rock, by borrowing within 1 mile or less of the point. This rock, or rather rocky bank, was discovered by Mr. Wm. Walker, Master, commanding H.M. store-ship Dispatch; and the circumstance which led to its discovery affords so

Dispatch Rock.

* The Amsterdam, 84, from Batavia to Holland, having reached the neighbourhood of the Cape, lost her masts in a gale on the Bank, and labouring exceedingly, she became leaky, and made for Algoa Bay. She let go her anchors somewhere off Beacon Point, but cut from her anchors and went on shore near St. Croix Islands, and in two days her huge hull sunk down in the quick-sands of the coast so as almost to disappear. Mr. Walker, who gives this account, was charged with the conveyance of part of her crew to the Cape, and received the information relative to her loss from her second lieutenant.

useful a hint to seamen, that Mr. Walker's account of it is here given :—" On the 2nd of January, 1818," he says, " I was working into the bay in a gale of wind, and *observing the sea to run higher* in a particular part than any where else, I concluded that a shoal might be there, and took cross marks for it. On the 3rd the wind had died away, and the water being smooth, I went in my boat, and found, by means of the marks I had previously taken, the shoal off Beacon Point. It proved to be a *rocky* shoal, extending in a N.W. and S. E. direction about 200 yards, being about 40 yards broad, with 9 or 10 fathoms on each side of it. The bearings from the shoalest part of the bank were as follows:

Mr. Walker's account of the discovery of Dispatch Rock.

| | |
|---|---|
| " Blockhouse in the fort near the landing place ... ... ... | N.W. |
| Grand Isle St. Croix ... ... ... ... ... ... ... ... | N.E. ½ E. |
| Western extreme of rocks off Beacon Point ... ... ... | N.W. by W. ¾ W. |
| Extremity of Cape Recif ... ... ... ... ... ... ... ... | S.S.W. ¼ W. |

Least depth of water 8 feet."

About 1 mile S. by W. from Dispatch Rock, there is a bank of 6 fathoms coral.

Redwing Rock, discovered by Capt. Frederick Hunn, of H. M. sloop Redwing, in 1819, is farther in the bay, and appeared to be about 8 fathoms in length and 2 or 3 fathoms in breadth, having 2½ fathoms on it, the least water, with 8 fathoms close to. When upon it, the extremity of the breakers off Cape Recif bore S. 8° E., Cape Recif S. 2° E., Bird Island off Beacon Point South, Fort Frederick W. ½ S., St. Croix northernmost island N. E. by E. ½ E. off shore about 1½ miles.

Redwing Rock.

From abreast of Beacon Point or Dispatch Rock, to the anchorage off the landing place at Markham Cove, or Baken River, the course is N. N.W. ¾ W. and N.W. by N., distance 2½ miles, the soundings regular and clear; the coast and sand hills covered with bushes. The bottom is sandy all over the bay, except between the grand and south isles of St. Croix, to the eastward of them, where the bottom is foul. The channels betwixt any of these isles are safe; between the N.W. isle and the grand isle, the depths are 10 and 12 fathoms; between the latter and the south isle, 15 and 15¼ fathoms; and between the N.W. isle and the main, 7 fathoms, in a channel about ¾ of a mile broad. To the S.W. of the grand isle, ships may anchor, and find shelter from the S. E. winds, and it is an eligible situation for clearing Cape Recif, when the gale moderates sufficiently to permit a ship to carry sail.

Approach to the anchorages.

Isle St. Croix.

Directly over Markham Cove stands Fort Frederick, which from several positions is not easily seen; but Lady Donkin's Pyramid, half a mile to the S.E. of Fort Frederick, is conspicuous to ships approaching Port Elizabeth.

From Markham Cove to Ferrara River is N. by E. nearly 4 miles, between which and Beacon Point may be considered the anchorage of Port Elizabeth: the water deepens gradually from the shore over a hard sandy bottom, in which the anchors hold well, but many anchors have been lost by merchant vessels lying near the shore, where hempen cables are liable to be cut; therefore, no ship should anchor nearer the shore than 6½ fathoms unless she have chain cables, until the bay is cleared of anchors. Capt. Moresby, of H. M. S. Menai, lay off Port Elizabeth from the 29th of April until the 25th of June, 1820, during which period there were only two days that they could not communicate with the shore. A swell rolled in with a S. E. wind, but never any high breaking sea: ships have from time to time (Capt. Moresby observes) rode during the whole year in this bay, and some of his Majesty's ships have rode out the heaviest S. E. gales that have been known.*

Port Elizabeth anchorage.

* August 19th, 1828, the ship Philip Dundas drove on shore at Port Elizabeth during a heavy gale at S.E.

Ferrara River. Ferrara River is closed at the mouth by a bank of sand, except at spring tides, and is not worth notice.

Anchorage. The common anchorage off the landing place is in 6½ or 7 fathoms, sandy bottom, the mouth of Baken River W. ½ S. about 3 quarters of a mile, and the outermost point of the land S. by E. ¼ E. If at the Isles St. Croix, bring the grand isles to bear from S. S. E. to S. S. W. distant half a mile, or rather more, in 10 or 10½ fathoms sandy bottom.

Landing place. Watering place. Supplies. The usual landing place is on a small beach close to the northward of Baken River, the mouth of which is generally closed with a dry sandy bar; about 100 yards within it there is a good spring of fresh water, and about 3 quarters of a mile to the southward there is a small run of water, called Baken Fountain. With a westerly wind, any number of casks may be easily rafted off from the shore. Bullocks and sheep are good and plentiful, fish may be caught in abundance with hook and line near the reefs, and oysters are got at low water on the springs; a ship may also refit here with spars, as there are large forests inland, but wood is scarce near the sea.

Zwartkop River. Zwartkop River, in lat. 33° 51½′ S., bears N. ¾ E. distant 10 miles from the cape, W. ½ S. from the Grand Isle St. Croix 7½ miles, and N. E. by E. ½ E. from Ferrara River about 4 miles; at a favourable opportunity, a boat may pass through the surf over the bar into this river, where it is navigable for small vessels 8 or 9 miles up; a little below this the water is fresh. This river may become of great consequence if Port Elizabeth continue to flourish, but the anchorage here is more exposed than at Baken River.

Tides. Supplies. The coast is generally sandy around the bay; to the westward there is a range of hills, and to the N.W. of Zwartkop River, the Craggy Mountain may be seen inland, when the weather is favourable. It is high water at 3h. 30m. at full and change of the moon; the tide rises 6 feet perpendicular; variation 28° 48′ W. in 1817. Bullocks and sheep may be had at moderate prices, but vegetables are scarce. Fish are caught near the isles, and about the reefs of Cape Recif. Oysters may be got on the rocks along shore, and plenty of fish may be obtained in Zwartkop River with the seine. The Isles St. Croix abound with seals; and this, and Plettenberg Bay, abound with whales, in July, August, and part of September.

Directions by Captain Dighton. Captain Dighton, of the Upton Castle, carried a detachment of 450 troops from the Cape to Algoa Bay in October, 1811, and as he found considerable difficulty in discerning it, having run to the eastward as far as Bird Islands, before he found his mistake, and was obliged to work back to the westward; he thinks, therefore, that the following directions may prove useful in approaching Algoa Bay from the westward.

Ships coming from the westward bound into Algoa Bay, after passing St. Francis Bay, and getting abreast of Christian Vogels River, ought to keep near the shore in about 25 fathoms water: the entrance of this river may be known, if near the land, by a large patch of sand on its western side, and there are no sand patches for 2 miles east of it, this space being green, or covered with brushwood close to the sea. When the entrance of this river bears N. E. you will perceive the mouth of a larger one, about half a mile to the westward, called Stadden River, from whence the course is S. E. by E. ½ E. to Cape Recif. If the weather be clear when off the latter cape, Craggy Mountain will be seen bearing N. by W. ½ W., and a high mountain with a

and was wrecked; and on the following day, August 20th, the ship Bride drove on shore at Cape Town, Table Bay, during a hard gale at N.W.

flat summit N.W. by N. Cape Recif is a low sandy point (of which there are several on this coast), not otherwise remarkable, having rocks projecting a mile into the sea, which at a little distance resemble islets. The small round hummock near the extremity of the cape, is not easily perceived, unless in a particular point of view. Having rounded the cape, steer North for the next Rocky Point, and pass it at 3 miles' distance at least, as a rock lies E. by S. from the point about this distance, with 6 feet water on it; from hence to the anchorage in Algoa Bay, the course is N.W. by N. in regular soundings from 18 to 7 fathoms. We anchored in 7 fathoms fine brown sand, with the flag-staff near the landing place, bearing S.W. $\frac{1}{2}$ W. $1\frac{1}{2}$ miles distant, Block-house W.S.W. $\frac{1}{4}$ S., St. Croix Island, E.N.E. $\frac{1}{2}$ N., Craggy Mountain N. by W. $\frac{3}{4}$ W., farthest extreme of land to the Eastward E. $\frac{1}{2}$ S., extremity of Rocky Point S. by E. $\frac{1}{2}$ E.

Fort Frederick. There is a small fort on an eminence near the landing-place, called Fort Frederick, but the chief military station is several miles inland.

Kuga River. Kuga River, in lat. 33° 48′ S. and 5 miles distant from Zwartkop River, is barred up at the mouth, and the water, which is very salt, flows into a small lake; the coast between these rivers consists of sand hills, with a flat sandy beach.

Sunday River. Read's Monument. Sunday River, in lat. 33° 48′ S. and 9 miles to the eastward of Kuga River, falls into the sea close to a remarkable rock, named Read's Monument,* between which and Cape Recif may be denominated Algoa Bay. The bed of this river is deep on the northern side, but the surf beats violently over the bar across its mouth; and as the coast here is exposed to the constant rolling swell, there is little chance of the river ever becoming navigable for commercial purposes. Sometimes boats *may* pass over the bar, but at the mouth of this river the coast becomes dreary and inhospitable, destitute of shelter for any class of shipping.

St. Croix Isle. St. Croix Grand Isle, in lat. 33° 47$\frac{1}{2}$′ S., lon. 25° 46$\frac{1}{2}$′ E., by Capt. Owen, distant $3\frac{1}{2}$ miles S.E. by S. from the mouth of Kuga River, and 6 miles W. by S. $\frac{3}{4}$ S. from the mouth of Sunday River, is about $2\frac{1}{4}$ miles in circumference. Another small rocky island, called Brenton Isle, is a little more than a mile S.W. from St. Croix, and about 3 quarters of a mile in circumference. South from the mouth of Kuga River 3 quarters of a mile, lies the Island Jahleel, about the same size as Brenton Isle.

The Craggy mountain over Algoa Bay forms the eastern boundary of the chain of mountains on the coast of South Africa, there being no remarkable high land farther to the eastward, for the coast is then of moderate height, with sand downs and steep cliffs in several places.

* In commemoration of a promising youth, a midshipman of H.M.S. Menai, who with three seamen perished, whilst surveying the coast.

## COAST OF AFRICA, FROM ALGOA BAY TO CAPE CORRIENTES.

Bird Islands.

BIRD ISLANDS, in lat. 33° 52′ S., lon. 26° 5′ to 26° 18′ E., by Captain Owen's survey, distant about 10 leagues E. ¾ S. of Cape Recif, consist of three low isles, with several black rocks above and under water, extending about 4 or 5 miles nearly N.W. and S.E., and distant 6 or 7 miles from the main land. H.M. Ship Stag examined these isles in March, 1814, in search of the wreck of the William Pitt; entering from the westward between them and the land, she anchored within them in 17 fathoms, and passed through to the eastward between them and Cape Padron on the following day. In mid-channel, the least water was 12 and 13 fathoms inside the isles, and in some parts 17 and 18 fathoms rocky bottom; but sounding in the boats, the depths decreased regularly to 6 or 7 fathoms close to the main, where the ground was found better for anchorage than near the islands. Bird Island is the easternmost of them, and is of round form, and about a quarter of a mile in extent; the landing was found difficult on account of the rocks; myriads of birds, particularly gannets and penguins, covered the isle. The next isle, about half a mile in length, called Seal Island, and the third called Stag Island, with black rocks that extend from it to the westward, were all covered with seals. There are two sunken rocks surrounded by others, partly visible at low water, but in fine weather the sea probably does not break high on them at high tide; one of these lies 2½ miles West from Bird Island, and S.W. by S. from the west end of the reef.

Doddington Rock.

DODDINGTON ROCK,* bearing S.W. from the centre of Bird Island, at 6 or 7 miles' distance, is in lat. 33° 57′ S., lon. 26° 11′ E., by Capt. Owen's survey; and it was on this rock that, in 1756, the Doddington East Indiaman struck in the night, when steering E.N.E. She soon went to pieces, and only about 23 of her crew, with the chief mate, reached Bird Island on pieces of the wreck, where they remained several months, and built a boat, in which a few survivors reached the Comoro Islands.

There are 25 and 26 fathoms water near the east and west extremes of Bird Isles, and the depths are thought to be from 35 to 40 fathoms near the Doddington Rock on the outside, which is very dangerous for ships making the land hereabout in thick weather, or in the night, more particularly, if standing toward the shore when working to windward.

Woody Cape.

Woody Cape is to the northward of the Bird Islands, in lat. 33° 46′ S., lon. 26° 14′ E.

* This description of Doddington Rock, Bird Islands, and adjacent coast, is chiefly by Mr. L. Fitzmaurice, R.N., who went in the Stag Frigate's boats to examine the isles and the channel. Although the Bird Isles were surrounded with high breakers, two small inlets or creeks were discovered at the west end of the easternmost isle, with smooth water, where the boats landed. On the beach of the main opposite to the isles, the high surf rendered it impracticable to land, and steep cliffs with sand hills seemed to present an impenetrable barrier to the interior.

CAPE PADRON, in lat. 33° 46′ S., lon. 26° 25′ E., by Captain Owen's survey, bears E. N. E. from Bird Islands, distant 3 or 4 leagues, being a projecting point of land, with a bay on the western side between it and Bird Islands; but although there is a channel between these islands and the main, through which the Stag passed, as mentioned above, that might be used in case of necessity, yet it is uncertain if there be any secure anchorage inside of these islands in bad weather, on account of the bottom being rocky near them, as far as that ship explored. Cape Padron.

To the eastward of Cape Padron, the sand hills become higher, and appear in square patches, the coast extending *true* E. N. E. 13 or 14 leagues to Great Fish Point, in lat. 33° 30′ S., lon. 27° 7′ E.; and $3\frac{1}{4}$ miles *true* North of this projecting point lies the mouth of the Great Fish River, or Rio de Infanta, in lat. 33° 27′ S.; the coast continues nearly in the same direction, about 8 leagues farther, to the entrance of the Keiskamma River in the Kaffre country, the west entrance point of which is in lat. 33° 17′ S., lon. 27° 32′ E. Coast eastward of Cape Padron. Great Fish River, and Keiskamma River.

Bojesman, Karega, and Kasowka Rivers succeed each other to the eastward of Cape Padron, but are only weak streams, running over a bed of light sand in the dry season. Other Rivers. Kowie River lies to the eastward of these, and receives its inland stream, like them, in a sandy basin, from which it forces its way through a narrow channel on its eastern side, not wider at low water than 20 yards; the surf broke across a bar about a quarter of a mile from the entrance but not violently, and at low tide there must have been several feet of water. The water appeared deep close to the shore, but about $2\frac{1}{2}$ miles to the southward of the river's mouth there are two extensive beds of rocks. Kowie River.

Kleine Monden is the next appearance of a river to the eastward; it seemed to have, at times, three outlets into the sea, but they were all closed in the dry season, and probably are open only at high spring tides, or when the mountain waters come down. Kleine Monden.

From the Kowie to the Great Fish River the coast has a more verdant aspect than it has between the former and Sunday River, the sand hills being covered with luxuriant bushes; but there is not an inlet or curve of any sort that offers shelter for ships, and the surf rolls in high breakers along the coast.

Great Fish River, near its mouth, passes through an open country, which is interspersed with picturesque ravines, generally clothed with bushes: from the S. W. side of the entrance a sand bank projects within 20 yards of the N.E. side, which contracts the stream; part of the ebb is thereby thrown back on the flat beach, runs to the westward, and finds an outlet close to the rocks on the western side. At this spot the water appeared deep, and the sea did not break successively for the space of ten yards, there being at times an interval of minutes, when a boat could easily have landed; when, however, the sea did break in this space, it was with treble the violence of the constant rolling surf along the sand before the mouth of the river. Great Fish River.

The position of Great Fish River may be easily known in fine weather by some distant undulating hills; when bearing N. N.W. they are between the ravines through which the river flows. This river, at particular seasons, swells to a considerable height, and then, from the violence of the stream, no vessel can possibly enter; but when the causes have ceased that filled its bed, the river becomes a mere brook.

Becca River, next to the eastward of Great Fish River, is not more at low water than 12 or 14 fathoms across at the entrance, which contracts the stream, makes the tides rapid, and the water apparently deep; the breakers are not more than would be expected at a depth of 8 or 10 feet, and resemble those seen at the mouths of rivers known to be Becca River.

navigable. This river, therefore, may perhaps admit coasting vessels, but the coast in its vicinity seems sterile and forbidding.

Keiskamma River.

KEISKAMMA RIVER, about 15 miles E. S. E. $\frac{1}{2}$ E. from the Becca, has an extensive basin as a receptacle for the inland stream; the extreme points between which the river flows, when its bed is full, are distant about a mile from each other, East and West; but it fills only when the mountain torrents are in action. Capt. Moresby, from whose observations this description of the coast and rivers to the northward and eastward of Cape Recif is chiefly taken, states that it was nearly high water when he visited the Keiskamma, the mouth of which was then about 70 or 80 yards across, with the stream running South into the sea, strong and deep. Part of the stream was forced back along the shore, similar to that at Great Fish River, but the greater part ran close along the low rocky shore, which forms the N. E. point; and there, the breakers not being constant, afforded a hope that there might be a channel at high tides for small vessels; but the wildness of the coast, with a flat reaching $1\frac{1}{2}$ or 2 miles to seaward, precludes every reasonable expectation that this river can ever be opened to the most enterprising trader. It probably can never be the resort of large ships, the tides being too feeble, and of too little elevation, the highest rise observed by marks on the shore being only 7 or 8 feet; and at low water the river did not exceed 40 yards in breadth. The ravine through which it winds extends in a N.W. and S.E. direction, and the entrance may be known at sea, in clear weather, by a range of mountains in the interior, one being an insulated cone flattened at the top, with a high mountain a short distance to the eastward, having three distinct elevations: when these mountains bear N. N. W. they are in one with Keiskamma River. The N. E. point of land, close to which the river flows into the sea, is low and rocky, projecting from a remarkable green hillock, detached from the one where the bank begins to rise: the S.W. point is a sandy hillock. Along the coast the sandy soil is covered with bushes, through which, at different places, the sand is visible.

Tides.

Captain Moresby's remark on the Rivers.

After a description of the coast from Cape Recif to Keiskamma River, Captain Moresby concludes his remarks concerning those rivers as follows:—"If, therefore, trade is ever carried on, it is my opinion, that by Port Elizabeth or Zwartkop River alone it can be effected with security."

N. extreme of Agulhas Bank.

The northern extremity of Agulhas Bank converges towards the coast, as the distance is increased to the eastward of Algoa Bay, the soundings being 80 or 85 fathoms about 7 leagues off Great Fish River entrance, and from thence towards Keiskamma River nearly the same; but abreast of the latter no soundings are found 7 leagues off shore. From this river's mouth, Cove Rocks are distant about 7 leagues, from whence the coast takes a more N. easterly direction to the first point of Natal, in about lat. 32° 22′ S., which has three small hills over it; from hence it continues in a direction nearly E. N. E. to the third point of Natal, in lat. 30° 55′ S., and lon. 30° 55′ E. Between these points lies the second, or middle, point of Natal, in about lat. 31° 18′ S. This coast, called Natal by the Portuguese, because they discovered it on Christmas-day, is destitute of good harbours, and little frequented; and being inhabited by negroes, who are inhospitable to strangers, and the coast being generally sterile near the sea, there is no inducement for any ship to touch there. The River St. John, in lat. 31° 34′ S., lon. 29° 29′ E., falls into the sea between the first and middle points of Natal; Christian River on the south side of the latter point, and Ant River, and Bloody River, between it and the third point, the former being in lat. 30° 29′ S., and the latter in lat. 30° 15′ S. Mostly all of these rivers on the S.E. coast of Africa are closed up at the

Coast of Natal.

St. John River.

Christian River.

Ant and Bloody Rivers.

entrance by sandy bars, on which there is generally a high surf. St. John River may be known by the two bluff points which form the entrance; between it and the first point of Natal a concavity is formed, and to the northward of the middle point, the coast assumes the same form, opposite to Ant and Bloody Rivers. Captain Owen has given names to the following parts of the coast, between the Keiskamma and the St. John. Cove Rocks, centre, in lat. 33° 6′ S., lon. 27° 52½′ E. Point Hood, lat. 33° 3′ S., lon. 27° 58′ E. Cape Morgan, lat. 32° 42′ S., lon. 28° 25′ E. Hole in the Wall, lat. 33° 3′ S., lon. 29° 1′ E. Ramehead, lat. 31° 48½′ S., lon. 29° 15′ E. Brazen Head, lat. 31° 44′ S., lon. 29° 19′ E. Positions by Capt. Owen.

PORT NATAL lies about 3 or 4 leagues to the northward of Third point; and the cape, or southernmost point of the bay, is in lat. 29° 53′ S., lon. 31° 2′ E., by Captain Owen's survey. This place is only navigable for small vessels, the bar being very dangerous, having only 5 feet on it at low water, and the rise of the tide is but 5 feet more, except in September and October, when there are about 12 feet in spring tides. There is generally a heavy swell on the bar, and as it is very narrow, two or three seas will carry a vessel over; the water will then deepen to 2, 3, 4, and 5 fathoms, and she ought to keep along the southern shore at a ship's length distance. When about a mile within the river, a piece of barren ground is perceived at the declivity of a hill, opposite to which there is anchorage in 4 fathoms at a cable's length from the shore; but it is confined, and not yet frequented by European vessels. The tide flows here till 10 o'clock on full and change of moon. Port Natal. Tides.

Coming from the northward, the south point of Port Natal is most conspicuous, and by its projection a bay is formed, where a vessel may anchor, with a S.W. wind, in 9 fathoms sandy bottom, the point bearing S.W. by S. 2 miles, the northern extreme N. 52° E., and the extreme of the bay S. 70° W. From the north point, some sunken rocks extend out a quarter of a mile; and in going into the port, the passage is between these and the sandy point on the larboard side.* To the S. westward there is a table mountain, with another of the same form under it. The banks of the river are low, abounding with hippopotami, and are overflowed at high tides. This place was frequented by the early voyagers to India; at present there is no trade carried on here, but poultry may be procured for metal buttons, &c. A large party of Boors from the Cape of Good Hope have lately settled here, and, after many sanguinary conflicts with the ferocious chief Dingan, appear now to be securely established. They have received several reinforcements, accompanied by their cattle, and are now cultivating the ground with remarkable assiduity and success.

The coast of Natal is generally high land, or of moderate height, interspersed with sand hills; and in many places the shore is rocky, with deep soundings near it. The country is said to be fertile inland, abounding with cattle and elephants.

Between Port Natal and Cape St. Lucia, soundings extend a considerable distance from the land, farthest abreast of Fisher River, named Morley Bank in the survey.

Fisher Point and River, in lat. 29° 16′ S., lon. 31° 33′ E., is distant from Port Natal 12 or 13 leagues to the N.E., having a bay on the north side of the point;— Fisher Point.

* By the surveys of Port Natal by Capt. Edward Hawes, in 1831, and Mr. W. T. Haddon, in 1835, the sunken rocks are on the southern side of the entrance, or larboard hand going in, and the Sandy Point on the northern side of the entrance, or starboard hand. The tide flows, according to these surveys, respectively, at 5h. 40m. and 4h. 30m. on full and change of the moon.

about 21 leagues farther, in a direction nearly N.E., lies Cape St. Lucia, in lat. 28° 32′ S., lon. 32° 28′ E.; and 7 miles farther north, lies the River St. Lucia, in lat. 28° 26′ S., lon. 32° 27′ E., by the survey of Captain Owen. From hence to Cape Vidal, in lat. 28° 9½′ S., lon. 32° 38′ E., the coast continues nearly in a N.E. direction, about 7 leagues, and then extends north a little easterly, about 42 leagues more, to the Island St. Mary, at the entrance of Delagoa Bay. This extent of coast from Cape St. Lucia has been called Fumos by the Portuguese, on account of the discoverers having perceived smoke in different places. It is generally composed of rather low land near the sea, and little frequented by Europeans, but was explored by Captain Owen in the course of the survey. About 16 or 17 leagues to the S.W. of Cape Fumos (called Cape Colato by Captain Owen) Gold Downs River is situated, in lat. 26° 55′ S., lon. 32° 48′ E., according to Capt. Webster, of the ship Mary Ann, from Bengal, who was becalmed some time off its entrance, and it appeared to be navigable for small vessels, with a large lagoon or harbour inland. Several parts of this coast have no soundings except near the shore.

Coast of Fumos.

Gold Downs River.

Delagoa Bay.

DELAGOA BAY, called also the Bay of Lorenzo Marques, from its discoverer, is of great extent, being 5 or 6 leagues in breadth East and West from St. Mary and Elephant Islands at the entrance, to the mouth of the principal river, which bears several names, being called Delagoa River, English River, Rio de Lorenzo Marques, and by the natives, Temby River. The length of the bay from North to South is about 8 leagues, but all the southern part is shallow and unsafe.

St. Mary Island, and the peninsula adjoining, of which Cape Colato is the north point, form the east side of the bay; this island is high undulating land, near the middle of which, on the east side, there is a single hill with white spots, and the island is separated from Cape Colato, by a narrow rocky channel. On this peninsula of the main there is a high hill, called Mount Colato. The northern extremity of St. Mary Island bears the name of Point Inyack, or Unhaca, which Capt. Owen made in lat. 25° 58′ S., and 14° 36′ E. of Devil's Peak, Cape of Good Hope, by chronometers: or in lon. 33° 2½′ E.

Inyack Point.

Elephant Island.

A little to the N.W. of St. Mary Island there is another small one, called Elephant Island, from which an extensive reef projects about 5 miles to the northward and westward; between this reef and other reefs, projecting 5 or 6 miles from the land on the north side of the bay, is the proper channel, about 5 miles broad. From Elephant Island, the south side of the bay is barred by a reef, which extends from the island to the main land on the west side of the bay.

Between Elephant Island and the reefs which project to the North and N. Westward of it, there is a narrow channel with various depths. The bank of soundings extends but a small distance to seaward; and after getting bottom the water shoals fast in running into the bay; the bottom is rocky, with usually very irregular soundings, requiring care in a large ship.

Directions.

A ship bound into this bay should keep boats a-head sounding, as the sands are said to shift with the tides, which are irregular. Outside the entrance, the general depths are from 5 to 7 fathoms, and in some places only 4¼ and 4½ fathoms at low water about 3 leagues distance from it, and nearly on the meridian of the east end of Elephant Island; a little more to the westward, there are from 6 to 8 fathoms. When a ship has steered in, about mid-channel between Elephant Island and the northern shore, the point, which is of a reddish colour, at the entrance of English River will be perceived; she may then steer towards it; the depths will be irregular, decreasing to 3

and $3\frac{1}{2}$ fathoms, when past the Island Shefean, which is on the north side of the channel, about $2\frac{1}{2}$ leagues outside of the river's entrance. A reef surrounds this island, projecting farthest from the N.E. part, to the eastward and northward. When the entrance of the river is approached, Point Mawhone, on the south side, must be avoided, as an extensive bank projects from it to the eastward and northward; and from the same point, a bank extends along the western shore of the river; Point Rewbun, the north point of the entrance, must therefore be approached nearest in entering this river, where the depths are 3 and 4 fathoms at low water between the points, increasing to 7 and 8 fathoms about 2 miles inside. Ships may anchor at discretion, 1 or 2 miles within the entrance, or farther up, where the depths are 8, 9, and 10 fathoms, to the distance of 4 or 5 miles from the outer point of the river. There is a good watering place on the southern shore, opposite to the anchorage; and a little above Point Talloqueen, a long sandy point on the same side, there is a small rivulet, where the Portuguese have a resident; opposite to the point on the other side of the river the ruins of the Portuguese fort are visible. *Anchorage.*

Sailing into or out of Delagoa Bay, the shoals will generally be seen in clear weather from the mast-head; but it is advisable to keep a boat a-head sounding, as the sets of tide are not regular, and there are often strong ripplings. The depths above mentioned are at low water spring tides; the bar of the river, which is outside the entrance, is shoaler than any other part of the channel, having only $2\frac{1}{2}$ and 3 fathoms on some places at low water; ships ought therefore to cross it with the flowing tide.

English River extends a great way into the country, and is the only one navigable for ships of moderate size; for although several other rivers fall into this bay, the shallow water on their bars prevents vessels of burden from entering them. The largest of these is Manice River, called River King George by Captain Owen, situated on the north side of the bay, opposite the Island Shefean, and Mapoota River, at the southern part of the bay, where the water is very shoal. *English and other Rivers.*

Capt. D. Inverarity, in 1802, observed the lat. 25° 58′ S., at the anchorage of English river, and made it by lunar observations in lon. 32° 41′ E. Captain Owen made the Factory Flag Staff in lat. 25° $58\frac{1}{4}$′ S., lon. 32° 37′ E. Variation 28° 7′ W. High water at 5 hours 15 minutes, on full and change of the moon, and the rise of tide 12 feet at the Portuguese Factory. At Shefean Island, 4 hours 40 minutes was the time of high water. *English River. Tides.*

A considerable trade was formerly carried on at these rivers for elephants' teeth; but few English ships, except whalers, now visit this bay. Although the Portuguese still retain a little intercourse with the natives, ships which trade here ought not to place much confidence in them, particularly if boats are sent a great distance up the rivers with goods to barter; for in such cases, the natives have been known to attack them, and massacre the crews. Elephants' teeth are procured in barter for India goods, and coarse stuffs of various kinds.

The bay abounds with fish, and inland the country is fertile, producing grain; bullocks, sheep, poultry, and other supplies may be procured, and also fruits, among which pine apples and water melons are the chief. Sugar canes are also cultivated by the natives. This bay is much frequented by southern whalers, who kill here the black whale; but it is a very unhealthy place, being subject to jungle fevers, which proved fatal to many of the officers and men, while employed on the arduous survey of this place in H. M. ships Leven and Barracouta, under the command of Captain Owen; and some of the whalers have been disabled by the loss *Supplies.*

of nearly all their people at this pestiferous bay.* The country inland is mountainous, but low where it fronts the sea, adjacent to the rivers.

On the coast to eastward of Delagoa Bay is Lagoa River, the entrance of which is in lat. 25° 20′ S., lon. 33° 13′ E. by the survey.

Cape Corrientes.

CAPE CORRIENTES,† small rock, in lat. 24° 7′ S., lon. 35° 30′ E., by the chronometers from Cape of Good Hope, bears about *true* N. 57° E. from Delagoa Bay, distant about 68 leagues. The coast between them is slightly concave, and has several rivers, the largest of which is Inhampura, in lat. 25° 11′ S., lon. 33° 32′ E., about 24 leagues from the Cape; and Gold River, a few leagues farther westward. Inhampura Shoals extend from lat. 25° 12′ to 25° 10′ S., and from lon. 33° 39′, the south extreme, to lon. 33° 46′ E., the north extremity, according to the survey.

Inhampura River and shoals.

Cape Corrientes has a hill over it, which may be seen 10 or 12 leagues: the coast about it is clear of danger, with deep water, the edge of the bank of soundings not extending above 3 or 4 miles off shore.

## COAST OF AFRICA, FROM CAPE CORRIENTES TO MOZAMBIQUE.

FROM Cape Corrientes to Cape Wilberforce, the distance is 5 leagues N.E.; the coast then runs in a northerly direction about 8 miles to Inhamban Bay.

Inhamban Bay and River.

INHAMBAN BAY is formed by the curved line of reefs which extend in a northerly direction from the south-eastern entrance point of Inhamban River. The Bay does not appear to have been yet minutely examined, but a few depths from 7 to 23 fathoms are given in it.

The south-eastern point of this bay is sandy, with a sand hill over it, called Barrow Hill, in lat. 23° 45′ S., lon. 35° 33′ E. From this point the coast turns sharp round to the westward, and, at 3 miles' distance, forms the low point at the entrance of Inhamban River, off which point a reef of heavy breakers extends in a northerly direction, to the distance of about 7 miles. This reef forms the western side of the bay, the anchorage being about 3 miles to the northward of Barrow Hill, in 7 or 8 fathoms.

* The unhealthy season prevails from the beginning of September until the end of April, during which period, ships visiting this place will be liable to the pestilential scourge, particularly if the people are employed on shore, or sent up in any of the rivers, to trade in the boats with the natives; and above all, if they sleep on the damp ground, from whence issue the poisonous miasmata during the night, in the proximity of the low mangrove swamps, near the banks of the rivers.

Current.

† Current Cape; the current generally setting round it to the S.W. and afterwards along the coast of Natal.

Between the low points which form the entrance of the river, the distance is about 5 miles, but it is almost barred up with low sandy islands and banks; the channel is near the north-western shore round the north point of the reef before mentioned, having variable depths from 2 to 12 fathoms; but it is narrow, and not frequented except by small vessels. Inhamban Town, in lat. 23° 51′ S., lon. 35° 25′ E., by Captain Owen, is on the eastern shore, about 8 miles up the river, where some trade is carried on by the Portuguese in slaves, &c., having here a resident, and a few troops for his protection; ivory may be procured here. Between the sandy point and Cape Corrientes, the current sets strong to the southward great part of the year, which will oblige a ship to anchor near the shore, if the wind fail in steering to the northward.

Inhamban Town.

Current.

The coast from Inhamban River extends nearly *true* North to Cape St. Sebastian; between them there are several rivers of small size, not navigable; the first, called French River, about 12 or 13 leagues to the northward of Inhamban, and another farther North, called Robber's River. This part of the coast has in general a sterile appearance, with sand points at the entrance of the rivers, and is high in some places, particularly to the northward of the river last mentioned. A headland, named Cape Lady Gray, by Captain Owen, is situated in lat. 22° 56′ S., lon. 35° 41′ E.

Coast to Cape St. Sebastian.

Cape Lady Gray.

CAPE ST. SEBASTIAN is in lat. 22° 4′ S., lon. 35° 32′ E., by the survey; the land over it, being of considerable height, may be seen at 10 or 12 leagues' distance. In approaching it, the land appears highest to the South, and there are no soundings at a greater distance than 2 or 3 miles from the shore. From this Cape the land trends to the westward, forming a bay, barred up with shoals between the Cape and the Bazarouta Islands, and the whole of the coast of Sofala from hence to Luabo River, the southernmost branch of the Cuama, is low and woody, with a sandy beach in most places.

Cape St. Sebastian and Coast of Sofala.

Just beyond the Cape are the Bazarouta Islands, extending in a chain to the northward, and appearing like one island in coming from the southward. Cape Bazarouta, the northern extremity of these islands, is in lat. 21° 31′ S., lon. 35° 33′ E., by the survey, having a reef projecting from it, which is covered at high water; a large cove is formed on the west side of the North island, and called Punga Bay, where a ship might find shelter from easterly, southerly, and westerly winds, and procure wood and water: it has from 7 to 9 fathoms water in it, but is lined by shoal banks on each side. The entrance is from the North, a little nearer to the north point of the Great Bazarouta or northernmost island, than to the main land opposite. There is no passage between these islands for ships.

Bazarouta Islands.

Punga Bay.

In hauling in for the land to the northward of Bazarouta Islands, the soundings decrease regularly on the bank, from 15 fathoms soft to 8 fathoms sand, about 4 leagues from the shore: but ships running for the land to the southward of Sofala must be careful of several dangerous shoals, covered at half-tide, stretching far out from the coast, and lying directly in the way of ships coming from the southward, and bound into Sofala with a westerly wind. One of these, called Inverarity Shoal, is in lat. 20° 42′ S., lon. 35° 10′ E., by Captain Owen's survey, and nearly 3½ leagues from the land, having been discovered by Captain D. Inverarity, in 1802, who made it in lon. 35° 38′ E., by lunar observations.

Shoals near Sofala.

CHULAWAN, or Holy Island, appears to be joined to the main land, and its north point is in lat. 20° 38′ S., lon. 34° 53′ E., by the survey, it being 5 or 6 miles in

Chulawan.

length, low, and covered with trees. In 1802, the ship India anchored here in 7 fathoms water, with the island bearing from S. 17° W., to N. 84° W., distant 2 or 3 miles, and the mainland bearing from S. 12° W. to N. 66° W.: several shoals projecting from the points of the island, and others detached from it, seem to render any navigable passage impossible, except for boats.*

Sofala River. SOFALA RIVER is distant from Cape Bazarouta about 29 leagues to the N. by W., and cannot be entered by vessels of great burden with safety, there being only 12 or 14 feet water on the bar at low tide, and the entrance is intricate. High water at 4 hours, and the rise of tide on the springs, marked 22 feet on the chart of the survey, which perhaps is only at times, with a particular high flowing of the tide. (Tides.)

From the anchorage under the Island Chulawan, the India steered along shore in from 12 to 5 fathoms water, until abreast of Sofala, and there anchored in 5 fathoms at low water, the flagstaff bearing N. 33° W., Matto Grosso N. 54° W., extremes of Sofala Bay from N. 53° W. to N. 35° W., Ponta de Zemba N. 8° W., and the extremes of land from N. 6° W., to W. 16° S., off the flagstaff about 4 miles, Matto Grosso 5 miles, and off Ponta de Zemba 4½ miles. The point of land, on which the fort is situated is insulated at high water, and the fort is in lat. 20° 11′ S., lon. 34° 46′ E., by Captain Owen's survey;† the village, consisting only of a few huts, lies near the fort on the north side of the river. The Island Inhancata, at the mouth of the river, appears as part of the main, being separated from it on the south side by a small channel, fit only for boats. In moderate weather, at high water spring tides, a vessel drawing under 14 feet may pass over Sofala Bar. The channel at present is between Sofala Spit or Sand, and Matto Grosso Sand, on the south side of the former. (Sofala Bar.)

Matto Grosso Sand, on which the sea breaks at a quarter ebb, bears from the point of this name S.S.E. ½ E., 1 or 1½ miles, and joins to the point. Ships ought not to enter this place without a pilot, or it will be necessary to buoy the tails of the sands, the channel being narrow, and deficient of proper land marks to guide a stranger.

A Portuguese resident, with a party of men, are stationed at Sofala; there are also some merchants, who procure ivory, slaves, &c. and some gold, for the ship that comes annually from Mozambique. Bullocks and poultry may be purchased from natives on moderate terms, but the reverse, if procured from the Europeans.

Luabo River. About 30 leagues E.N.E. of Sofala, in lat. 18° 57′ S., lon. 36° 1′ E., the entrance of Luabo River is situated, which is the southern mouth of the Zambesi or Great Cuama River. In this extent of coast, the land is low near the shore, with sandy plains; and several small rivers fall into the sea on this part of the coast of Sofala, which is safe to approach, the soundings being regular toward the shore. From Luabo River, the coast extends about 7 leagues E. by S., then turns again to E.N.E., which space comprehends the several entrances of the Zambesi River. The coast here becomes more elevated, with some red patches, where there is an inlet called India Cove, from whence a sandy plain extends to the northward 4 or 5 leagues. Luabo Shoals extend from the mouth of the river of this name, a considerable distance, to the

* Ships touching on different parts of the East coast of Africa, which are little frequented, ought to be careful in landing with their boats, for the natives have reason to be prejudiced against Europeans; French and English vessels, after enticing the natives on board, have carried them away and sold them as slaves. At Sofala, and other places on the coast where Portuguese reside, a guard is placed on board of any vessel that may touch there, to prevent illicit trade; but, by gaining the favour of the commandant, trade may be carried on at most of these places. They are all under the Mozambique Government, and all the coasting vessels belong to that port.

† Captain Inverarity made it in lat. 20° 15′ S., lon. 34° 45′ E., by lunar observations in 1802.

eastward, forming bars to the mouths of the Zambesi; the Elephant Shoals, in lat. 18° 56′ S., being about 3 or 4 miles off shore, are the outermost of these dangers. Elephant Shoals.

QUILLIMANE RIVER, S.W. point, terminates the sandy plain, mentioned above, and the entrance of this river, which is the northern branch of the Zambesi, is 1 mile in width between Seahorse or Hippopotamus Point, on the west side, and Point Tangalane on the east. This river is said to be 180 leagues in length, and about 6 leagues up, on the northern shore, the first Portuguese factory was constructed; in consequence of the undulations of the river, the distance to Senna, the principal settlement, in lat. 17° 30′ S., lon. 35° 44′ E.,* is more than 60 leagues. The flagstaff on Point Tangalane is in lat. 18° 1½′ S., lon. 37° 1½′ E., by the survey, but the entrance is not easily known, the land on each side being low, with coco-nut trees; on the southern point, there is a small sand hill. There is generally a considerable swell on the bar, which has 1½ fathoms on it at low water, and the tide rises 16 feet on the springs; high water at 4 hours 15 minutes. Inside the river, the depths are 4 to 12 fathoms in the entrance, between the points, and from 1½ to 6 fathoms from thence to the town, having various shoal banks in this space, and the Island Pequena about 4 miles inside the mouth of the river. About 3 or 4 leagues up, fresh water may be had from a stream on the north shore. Quillimane River. Tides. Fresh water.

A shoal bank projects to seaward in a S.E. direction from each point of the entrance, contracting the channel on the bar, which is formed by the union of these banks about 3 miles outside the river's mouth. Being bound in, steer for Point Tangalane, on which the flagstaff, or a few coco-nut trees may be perceived, bearing about N.N.W., and the river's mouth will be seen open to the left. The best bearing to cross over the bar, by Capt. Owen's survey, appears to be to keep the centre of the opening, bearing N.N.W., and steer direct for it with this bearing preserved, until within the points of the entrance. The breakers run very high in bad weather on the tails of the sands, and it is proper to keep in mid-channel between them. Observing the set of the tide, with the precaution of keeping a boat a-head, a stranger may enter the river, and keeping the N. Eastern shore aboard, proceed to Quillimane Town, which is about 4 leagues from the bar at the entrance, on the northern bank of the river, in lat. 17° 52′ S., lon. 37° 1′ E. by the survey of Capt. Owen. Variation 17° West, in 1826. Directions. Quillimane Town.

When southerly winds prevail, it is prudent to anchor in the road to the southward of Seahorse Point, in 4 or 5 fathoms at low water, about 3 miles off shore, which point may be known by sandy spots to the southward. In the opposite monsoon, the anchorage should be to the northward of the entrance of the river, as the winds frequently blow strong in both monsoons, and the current runs along shore with the wind. From this river, the Portuguese export slaves, elephants' teeth, and some gold. Outer anchorage.

About 42 leagues north-eastward from Quillimane River, the river Quizungo is situated, in lat. 17° 2′ S., where trade is carried on by boats from Mozambique: between these, there are other rivers of smaller size. From the Bazarouta Islands, near Cape St. Sebastian, the Paracel, or Bank of Sofala, extends along the coast to the Premeira Islands. The soundings on this bank are mostly regular; but it has some dangers, the chief of which are David Shoals, the centre in lat. 17° 31′ S., lon. 38° 32′ E., by the survey. Capt. David Inverarity, who discovered these shoals, says, about 12 leagues to the south-westward of Fogo, and 7 leagues from the main, in about lat. 17° 39′ S., lon. 38° 27′ E., there is a rocky bank, which the India, in 1802, crossed over in 6 fathoms Quizungo River. Sofala Bank. David Shoals.

* By Captain Owen's officers, who went up to Senna, and fell a sacrifice to the pestilential fever.

rocks, with several discoloured spots to the northward of her, which appeared much shoaler. This bank is a little outside the verge of soundings, and is probably very dangerous. When on it, the land was not seen from the mast-head.

Many whales of the black kind are seen; and the land may be generally discerned in 20 fathoms water. The winds on the coast of Sofala, prevail from South and S.E.; but in December, January, and February, the northerly monsoon extends along this coast; the current frequently sets to the southward, and at other times, it is very changeable.

Premeira Islands.

THE PREMEIRA ISLANDS (Ilhas Premeiras, or First Islands) lie adjacent to the coast, and are the southernmost of the long chain of islands extending along the district of Angoxa; they are named Fogo, Casuarina, and Epidendron. They are small, and surrounded by reefs with passages between them.

Fogo Island.

Fogo, or Fire Island, is nearly opposite Quizungo River, in lat. 17° 14′ S., lon. 38° 55′ E., named by the Portuguese from a light-house on it, which was formerly kept burning from the 1st of July, to the end of October. This is the southernmost of the Premeiras, and may be seen about 5 leagues from the deck, with breakers projecting from it about a mile or rather more.

De Sylva Bank.

About 1½ leagues W.S.W. of Fogo, there is a sand called De Sylva Bank, between which and that island a ship may pass in 14 and 15 fathoms, taking care to keep nearer to the island than to the bank. There is another channel between Fogo and the Crown Bank, which is 3½ miles E.N.E. of it, with the same depth of water as the former; and farther eastward, a third passage between the bank now mentioned and Casuarina Island, having in it 14 and 15 fathoms water. Casuarina Island is about 4½ leagues E. by N. from Fogo, and is very low: and a little farther in the same direction Epidendron Island is situated in lat. 17° 4′ S., lon. 39° 10′ E., also low, called sometimes Flat Island, and Palm Trees Island. This chain of islands and banks is about 3 leagues distant from the main land and parallel to it, with a channel of 8 or 9 fathoms, navigable for ships; but opposite to Epidendron Island, the channel is contracted to 4 miles width by Macalonga Point, projecting to the south-eastward in lat. 16° 59′ S. In passing through this channel, inside the islands, a ship ought to keep much nearer to them than to the main, and will then have about 8, 9, and 10 fathoms water in passing through; but to the eastward of Casuarina and Epidendron Islands, at 3 to 5 leagues' distance, there is no ground with 60 fathoms line.

Epidendron Island.

Macalonga Point.

About 9 leagues E. by N. ½ N. of Epidendron Island, is a sandy island, in lat. 16° 47′ S., lon. 39° 34′ E., called Moma Bank; and in the interval there are some reefs with breakers, between which and the bank there is a passage, and another with 8 and 10 fathoms water between the reefs and the island. These islands are all surrounded by extensive reefs.

Moma Bank.

Angoxa Islands.

THE ANGOXA, or ANGOZHA ISLANDS, are three in number, with two reefs of breakers between the two easternmost of them. They lie parallel to the coast, about the same distance from it as the Premeira Islands: ships may pass between them, also between them and the coast, in 8 or 10 fathoms soft ground, by keeping nearer the islands than to the main; but it would be imprudent to run through these channels in the night. Caldeira, the westernmost of the Angoxa Islands, is in lat. 16° 39′ S., lon. 39° 46′ E. The island to the eastward of Caldeira, has been named by Captain Owen, Hurd Island, between which and Mafamale Island, are the

Caldeira.

two dangers before mentioned, and which are called Michael Reef and Walker Bank, and these two seem to be only sand banks, or reefs above water.

Mafamale Island* is the easternmost of the Angoxa Islands, and situated in lat. 16° 20′ S., lon. 40° 4′ E., by Captain Owen's survey. Captain Huddart, 26th August, 1784, made it in lat. 16° 21′ S., and 22½ miles East from Europa Island, in three days' run, by chronometer; a reef surrounds the island, projecting farthest to the eastward. All these islands are small, none of them more than 2 or 3 miles in extent, and usually surrounded by reefs. To the N.W. of Mafamale, in lat. 16° 16′ S., lon. 39° 57′ E., lies the entrance of Angoxa River, the bar of which is very shallow, but frequented by the boats of Mozambique. Mafamale.

To the north-eastward of Mafamale, about 5 leagues, in lat. 16° 8′ S., lon. 40° 12′ E., lies the Bank or Shoal of St. Antonio, nearly covered at high water, between which and the land there is a channel; passing through, a ship should not approach the coast nearer than 7 fathoms, nor deepen more than 11 fathoms in the offing. St. Antonio Shoal.

About 6 or 8 leagues to the N.E. of St. Antonio Shoal, at the distance of 5 or 6 miles from the shore, there is a dangerous rock, on which the sea does not break at high water; to avoid which, a ship ought to keep in 20 fathoms water, or more, in passing along the coast at this place: this danger is probably what is called Huddart Shoal, by Captain Owen, situated in lat. 15° 47′ S., lon. 40° 28′ E., and he found from 3¼ to 5 fathoms water passing between it and the main. A dangerous rock. Huddart Shoal.

MOGINCALE SHOAL, situated about 2 leagues from the high part of the coast of the same name, renders the preceding caution more necessary, as the sea breaks on it at low water spring tides, but there are 2 or 3 fathoms on it at high water. Captain Owen makes its northern part in lat. 15° 33½′ S., and the South part in lat. 15° 36′ S. The Scarborough, 22nd June, 1735, in 16 fathoms hard sand, saw breakers on this shoal bearing from N.E. ½ N. to N.E., distant about 2 leagues; she steered out S.E., and observed in lat. 15° 37′ S. extremes of the land from N. by E. ½ E. to W. by N. ½ N., the breakers then bearing N.W. by W., no ground 30 fathoms, and distant from the shore 6½ or 7 leagues. This shoal appears also to have been seen in the ship Duke of York, bound from England to Mozambique in 1723, by the following extract from her journal. "August 6th, 1723, at 10 A.M., saw breakers on the Firebrass Shoal, extending across it; and it is above 2 miles in length, in the form of a triangle, the outer point projecting about 2 leagues from the shore, and lies in lat. 15° 30′ S. The best mark for this shoal is an opening bearing W. by S. from it, like the entrance of a river, there being no other opening in the land of a similar kind, between lat. 15° and 16° S. The land abreast of the shoal is rather higher than to the southward, interspersed with patches of trees, of black aspect, when contrasted with the sandy coast. When to the N.E. of this shoal, several palm trees on an island called Mafalane Movya, will appear as part of the main; and to the northward of this island there is a sandy beach 4 or 5 leagues in length, ending at Bajone Point, which is the South point of Mokamba River. Along this beach called Movinxes, there are tall trees, resembling pines when viewed from sea." Between Mogincale and Mokamba River, the coast should not be approached nearer than 16 Mogincale Shoal.

* Called also Mafamede and Matamede, is, like most of these isles, merely a covering of sand over a coral base, not more than eight feet above the level of the sea, yet it is clothed with a grove of stately casuarina trees, some measuring about 10 feet in circumference, and most of them as straight as the common fir, without a branch for 30 or 40 feet above the ground, and many of them 150 feet high, rendering them visible from the mast-head at 5 or 6 leagues' distance.

Other Shoals. fathoms, on account of another shoal of small extent, said to have 3 fathoms water upon it, and distant about 3 leagues from the shore; probably the rocky shoal on which the Firebrass struck, having only 10 feet water upon it, situated in about lat. 15° 30′ S. Captain Owen has given the name of Barracouta Reef to a danger in this lat. 15° 30′ S., lon. 40° 33′ E., which projects about 2 miles from Barracouta Point in the same latitude.

Bajone Shoal and Point. BAJONE SHOAL, in lat. 15° 26′ S., lon. 40° 42′ E., by the survey, lies about 6 or 7 miles E.N.E. from Barracouta Point, and 4 miles off the main-land abreast, and is dangerous, though there is a passage inside of it for small vessels. Bajone Point, in lat. 15° 10′ S., lon. 40° 45′ E., is a projecting head-land, forming the south point of Mokamba Bay. Mokamba Bay. This bay has very deep water in the centre, and apparently also on its northern shore, but its southern shore is lined with reefs. Off its north point, called Point Sunkool, are the Sunkool reefs, or coral flats of Mozambique, which extend eastward from the point to St. Jago Island, and from thence in a northerly direction to the island of Mozambique.

Port Mokamba. PORT MOKAMBA, is at the head of Mokamba Bay, about 7 miles N.N.W. of Point Bajone. Its entrance, which is upwards of a mile wide, is in lat. 15° 6′ S. Point Mudge, the outer south entrance point, has a reef projecting from it 1½ miles to the eastward; it is proper, therefore, to keep nearest to the northern side of the bay in approaching the entrance of the port, and to borrow towards the north point, called Mokamba Point, which is steep to. About 2 miles inside Point Mudge, on the southern shore, is a second point, called by Captain Owen, Point William. This point is foul, and has a detached rocky patch off it at the distance of more than half a mile. The port, which opens inside of Point William, is a spacious circular basin, with various depths, from 18 to 4 or 5 fathoms in some places, where ships may lie land locked; but there are some shoals near the shore, and at the S.W. part of the harbour, fronting the river Tamonia.

Captain Owen gives the following directions for entering the port:—

Keep the Sunkool shore on board, or bring Mokamba Peak to bear W. by N. and steer for it until Point William is brought mid-channel, between Points Mudge and Mokamba, about S.W. ½ W. Steer then on this course for Point William until midway between the three points, and then W. by N. ½ N., until fairly within the harbour. The peak of Mokamba is on the north shore, nearly half a league within the point of that name, and is perhaps 2,000 feet high.

From Mafamale to Mogincale Point, the distance is about 18 leagues; from that Point to Mokamba Bay about 9 leagues, and from thence to the entrance of Mozambique Harbour 3 leagues.

St. Jago Bank. The bank that extends from the North point of Mokamba Bay to St. Jago, and Mozambique, is called St. Jago, and is steep to, composed of rocks, very dangerous, and the sea breaks on it in bad weather.

Mozambique Harbour. MOZAMBIQUE HARBOUR is one of the best on the east coast of Africa; the land around is mostly low near the sea with topes of coco-nut trees in several places. The two islands, St. Jago and St. George, lie to the southward of the entrance of the harbour. Cabeceira Shoal extends round the point of the same name, bounding the channel on the north side. Between 2 and 3 miles N.E. of the point, and near the northern extremity of this shoal, there is a small low island, called Arbores, or Tree

Island, with two smaller islets above a mile to the southward. The island of Mozambique, on which the city stands, is about $1\frac{3}{4}$ miles long, very narrow, and placed like a break-water, nearly midway between the entrance points of the inlet; within the island is the harbour, under the fort and town. St. Jago Bank, already mentioned, extends from that island to Mozambique Island, and from thence to the western shore.

To sail into the harbour from the offing, steer for the island St. George, which is 2 miles to the northward of St. Jago, giving a berth of a quarter of a mile to the N. E. end, from which projects a reef of rocks. Having passed this island on the north side, steer for the flagstaff of the Mozambique Fort, keeping Paō* Mountain open a little with the North Bastion, if the wind is northerly; and on with it, if the wind be southerly, which will carry a ship up with Nostra Senhora de Bellawerty, a low church at the foot of the north-eastern angle; from which a spit projects to the eastward about 300 yards, dry at low water spring tides, and is steep to. The pilots have no mark for this spit, but go entirely by their distance from the Fort and Cabeceira Shoal, which is generally discernible by green water on it. The passage between St. George and St. Jago, with a southerly wind, may be taken by small ships coming from the southward, it being nearer. Keep mid-channel between these islands until Arbores, or Tree Island, is open with the white sand on the west side of St. George Island, then steer for Cabeceira church, or the north angle of Mozambique Fort, if the wind is scant from the westward, which will carry a ship over the sand banks that lie to the westward of St. George Island in 3 to $3\frac{1}{2}$ fathoms at low water spring tides; and having opened Paō Mountain with the Fort, observe the former directions. The passage to the southward of Mozambique is only fit for boats. When inside of St. George Island, a ship may anchor and make the signal for a pilot. Directions.

In the proper channel to the northward of St. George Island, the general depths are from 7 to 10 fathoms in passing the island, and from 6 to 8 fathoms in sailing from it to the Fort, with Paō Mountain a little open from the North Bastion. To the westward of the Fort, the water becomes more shoal, the general depths being from 3 to 4 fathoms abreast the town where the ships moor, at less than a quarter of a mile from the shore. When past the Fort, a ship, in steering for the anchorage, should keep near the shore, on account of a bank of sand, with 2 fathoms on it at low water spring tides; the nearest part of it is distant a little more than half a mile from the town, bearing to the northward. Ships may moor a little within the Fort, before they come to the bank now mentioned, or directly betwixt it and the town, at discretion. From Mozambique Island, the harbour extends in a westerly direction to the distance of 5 miles, and is about $1\frac{1}{2}$ miles in breadth between the banks which line each shore, the general depths being from $4\frac{1}{2}$ to 6 fathoms at low water. About two miles from the upper end of the harbour it converges and forms a kind of cove or inner harbour, with 4 and 5 fathoms water; and the rivers Ampapa (or Apazafoo) and Mushereel (or Meshurel) fall into it at the extremity, near which are some villages and garden houses. Off the south point of Mozambique Island, St. Lorenzo Fort is situated, and half a mile farther to the north-eastward, a church called St. Antonio.

Capt. Inverarity, from whose survey this account of Mozambique Harbour is mostly taken, by observations made in 1802, places the Island Mozambique in lat. 15° $1\frac{1}{2}'$ S., and lon. 40° 47′ E., by lunars. Observations by the French, make it in lon. 40° 46′ E.; the Portuguese survey of that part of the coast places it in lon. 40° $43\frac{1}{2}'$ E.; Captain

* Paō (Pau) Mountain is a hill of round form, resembling a foot or shoe, distant $5\frac{1}{2}$ leagues from St. George Island; and is situated inland about 3 leagues to the westward of the upper end of the harbour. There is a table hill inland to the northward.

Owen, in surveying the coasts of East Africa, made Fort St. Sebastian in lat. 15° 1′ S., lon. 40° 47′ E.; Mozambique in lat. 15° 1′ S., lon. 40° 47′ E. The variation about 10 leagues East of the harbour was 16° 9′ W. in 1826; and at Mozambique, 16° W. in 1824. High water on full and change of moon at 4h. 15m. The rise of tide 12 feet.

Tides.

The following remarks are by Capt. Owen:—

"In the outer bay of Mozambique, there are three coral knolls, the two southern of which have never less than 3 fathoms, and are in the fair way of the South Channel. The northern one has only 2¾ fathoms in one spot; it is small, and lies in the fair way of the North Channel, reducing the channel between it and the rocky flat between the south end of Paō reefs, and the sands South of Cape Cabaceira, to half a mile wide."

"Within the harbour, the Leven Banks may be said to be the only obstacles to free navigation, and these are not three cables' lengths off the N.W. end of the island; between them and the shore of Mozambique Island is the best and most commodious anchorage, the outer reefs are always sufficiently visible by day."

"To enter by the North Channel between Tree Island reefs and Cabaceira on the North and St. George Island on the South, observe that the reefs are always sufficiently manifest on the outside, but the rocky flat and the northern coral knoll are in the way of large ships. Being the north extreme of Mozambique Island, and fort, N.W., or the Paō Mountain, over the white buildings on Point Mapéte, nearly on that bearing, this will lead clear in through the narrows, and when Kisumbo and its village are open to the northward of the fort, a ship may haul close round the foot of the fort and choose her anchorage."

"To avoid the south point of the Harp-shell or Cabaceira sands in entering, the Paō Mountain may be kept on, or but little open to the northward of the Fort, until Tree Island be quite shut in with Cape Cabaceira, when the Paō may be brought on with the white buildings of Mapéte, or mid-way between the said extreme point and its brow N.W. as before directed."

"To avoid the spit which projects a quarter of a mile East of the north bastion of the port, a ship must not shut in the S.W. battery with the Magazine Point, or eastern shore of Mozambique, or the eastern shores of Cape Cabaceira, until the cliffy shores of Lomboo, or the village so named, be seen clear of the North Bastion, and must not haul in for the fort until Kisumbo village and port are seen about W. by N.: at low water this spit is clearly visible and often dry; but at high water it is not so, and is dangerous."

"If a ship enter by the South channel, and fear the knolls, she had better send boats to lead her through them, as the pilots are not only ignorant but wicked."

Supplies.

This port depends on Madagascar and other places for supplies of provisions; bullocks are, therefore, not procurable under 15 dollars a head, and rice from 2 to 3 dollars per bag. Water is a scarce article when the harbour abounds in shipping, there being only two good wells, one on the island, the other on the main; the rest are all brackish, the water in them being only fit for cooking.

Water.

Trade.

From this place, 10,000 slaves are said to be annually exported to India, the Islands Mauritius and Bourbon, the Rio de la Plata, and coast of Brazil, at an average price of 45 dollars each. The other articles exported, are ivory, Colombo root, gold brought from Zeno and Sofala, the latter in small quantities; also ambergris, some amber, and cowries. Although the Portuguese Government endeavour to exclude strangers from trading here, there is, nevertheless, a considerable contraband trade carried on.

The prevailing winds on the coast about Mozambique, are northerly from October to April, and from the southward during the rest of the year. The current sets strong to the southward, when the wind blows from the northern quarter. Winds.

PORT CONDUCIA is to the northward of Port Mozambique, from which it is separated by the peninsula of Cabaceira; it is nearly 3 miles wide at its entrance, between Point Conducia and Kissangula or Sombrero Islet, with irregular depths from 20 to 6 or 5 fathoms, and the shore on both sides is fronted with shoal banks to the mouth of Conducia River, which is 7 miles to the westward of Kissangula Isle. The depths are mostly from 8 to 5 fathoms towards the western part of the port, from whence the passage having 3½ to 5 and 6 fathoms in it, winds between the banks on each side, round the north point that forms the entrance of the river or Inner Harbour, which seems perfectly secure (by the plan given in the survey), with depths from 6 to 4 fathoms. Port Conducia.

The outer Port or Bay of Conducia is 6 miles wide at its entrance, between Tree Island on the South, and Quintangonya Island on the North, its general depths, as far as it has been examined, appear to vary from 6 to 16 fathoms. Capt. Owen has given the following directions for the Port:—

"Having made the land to the northward of Quintangonya in lat. 14° 51′ S., a ship may coast as close as she pleases, and, if bound to Conducia River, she must haul round the south point of Quintangonya, steering W. by S. ½ S. for Cape Conducia, which is the eastern cliff and elevated ground of the peninsula of Cabaceira; and when the pointlets, or two little points (which are the only rocks to the westward of Sombrero islet), bear N. by W. ½ W. and the Table Mountain is open to the westward of them, a ship may steer in N. N. W. ½ W. and coast the northern shore by the plan published by the Admiralty into such anchorage as she may choose."

"In entering Conducia Bay from the southward, with a commanding wind to stem the current, round Tree Island as close as convenient, and steer N. by W. ½ W. for the Table Mountain, just open of the pointlets, and when Cape Conducia bears S.W. by W. ½ W., steer N.N.W. ½ W. or N.W. ½ N., and afterwards by the plan, the lead, and the eye, as convenient."

Port Velhaco, formed on the west side of Point Quintangonya, and fronted to the South by the island of this name, appears not to have been examined by the naval surveyors under Captain Owen, but there are 4 fathoms marked in the entrance leading into it, between Quintangonya Island and the point. The south point of Quintangonya Island is in lat. 14° 52′ S., lon. 40° 51′ E. Port Velhaco.

"It is necessary," says Captain Owen, "for the navigator to bear in mind that the Table Mountain is in lat. 14° 41′ S., and lon. 40° 40′ E.; that there is a perpetual current running down the coast, and that its greatest velocity is precisely from the island of Quintangonya to Cape Bajone, and close to the outer reefs; so that during the northern monsoon, ships desirous of entering Mozambique, or either of its adjacent ports, must make the land well to the northward, between Cape Langa and Quintangonya. But the instant a ship is within the line of the outer reefs, the current will be no longer felt, and she will be in the tide-way only; and we always found the current weakest, sometimes hardly perceptible, at spring tides, when they of course were strongest."

# COAST OF AFRICA, FROM MOZAMBIQUE TO THE EQUATOR.

Coast northward of Mozambique.

THE land near the sea is low about Quintangonya Point, and takes a northerly direction to Quisimasugo River, which is distant 6 or 7 leagues from the Point: about 5 or 6 leagues farther, lies the River Fernando Veloso, said to be spacious and safe, with deep water from 15 to 25 fathoms, and affording good anchorage on the west side, within the entrance, which is bounded on the East side by the headlands of Point or Cape Melamo, in lat. 15° 25′ S., lon. 40° 51′ E. From hence, the distance is about 5 leagues to Point Laguna in lat. 14° 12′ S., lon. 40° 45′ E., abreast of which, projecting about 2 leagues from the shore, is the dangerous reef of breakers, called PINDA SHOAL, in lat. 14° 15′ S., lon. 40° 51′ E., the outer extremity, making it prudent to keep 3 leagues from the coast in passing along here. Opposite to the north point of this reef, is Memba Komah Bay, extending 3 leagues or more, inland to the westward, with Temba River at the north-western angle. The water is very deep in the centre of the bay, but it is said, that ships may anchor in good ground on its northern side, sheltered from all winds, and find plenty of fish, wood, and water.

Pinda Shoal.

Memba Komah Bay.

From Pinda Shoal to Camonco or Camouco River, the distance is about 5 leagues; and from hence to Sirencapa or Soreessa Point, about 9 leagues, from which point, Mancabala Reef extends 5 or 6 miles to the southward, parallel to the coast, and distant from it 3½ miles at its southern extremity. About 1 to 2 miles South from the extremity of Mancabala Reef, Indujo Reef is situated in lat. 13° 39′ S., extending East and West about a mile. Between these dangerous reefs there is a channel, with 5 and 6 fathoms water, and betwixt them and the coast, the depths are from 7 to 10 fathoms to the southward, shoaling to 2 or 3 fathoms towards Point Soreessa, in the bight within Mancabala Reef, which is called Almeyda Bay, and affords safe anchorage in all winds in from 6 to 4 fathoms. The River Minsangegy is to the S.W. of Indujo Reef, about 3½ miles, and near the point that forms the southern part of Almeyda Bay. Soreessa Point is in lat. 13° 33′ S., lon. 40° 37′ E., by the survey.

Mancabala and Indujo Reefs.

Almeyda Bay.

From Memba Komah Bay to Soreessa Point very remarkable hills extend inland, part of them being composed of sharp craggy mountains. The highest and most conspicuous of these mountains, called Pico Fragos, or Craggy Peak, is in about lat. 13° 24′ S., lon. 40° 1′ E., and these craggy peaks are the best mark for this part of the coast.

Pico Fragos.

Current.

It may be observed, that the currents generally set to the southward along the coast of Mozambique, as they do on the coasts of Sofala and Natal.

From Soreessa Point, the direction of the coast is nearly *true* North 10 miles to Point Badgely, a bay being formed between them, with soundings of 15 to 5 fathoms; and from Point Badgely to Point Maunhané or Devil's Point, in lat. 12° 56½′ S., lon. 40° 38′ E., the coast extends *true* North a little easterly about 9 leagues' distance,

Maunhané or Devil's Point.

having soundings near it, but it is fronted by a reef, projecting in some places above a mile from the shore.

Memba Bay.

MEMBA BAY, sometimes called Pomba Bay, is about 5 miles to the westward of Point Maunbané, and is a little more than a mile wide, with soundings of 35 and 30 fathoms. The north point of the entrance is in lat. 12° 56′ S., lon. 40° 33′ E., being bold to approach, and the land on the south side, which is all high, may also be approached within a quarter of a mile. This bay seems not to have been known to Europeans until it was explored in 1824, by Captain Vidal, and the other officers under Captain Owen, and their survey marks it as an excellent harbour, opening within the entrance into a large oblong basin about 8 miles in length, North and South, and 4 or 5 miles in breadth, with depths mostly from 18 to 7 fathoms, decreasing towards the edges of the reefs and banks that front the surrounding shores of the bay. The course into the entrance is W. by N. ½ N., and when within the points or heads which form it, a ship may haul either to the northward or southward, and anchor completely land-locked in 10 or 12 fathoms, as may be preferred, in either the north or south arm of this spacious harbour. About 2½ miles to the N.E. of Point Maunbané lies a bank of soundings, where anchorage may be got in 9 to 12 fathoms.

Areemba Point.

AREEMBA POINT, in lat. 12° 38′ S., lon. 40° 39′ E., distant 6½ leagues from Point Maunbané, may be considered the southern boundary of the Querimba Islands, as the first of these, called Quipao, is united with the south extreme of Areemba Point by a reef, which forms a cove or small harbour at the west side of Quipao, with from 5 or 6, to 4 and 3 fathoms water. On the north side of Areemba Point, betwixt it and the chain of reefs and islands to the northward, there is a passage of 5 to 3 fathoms into a harbour formed inside of the reef and Island Quizeeva, having the Fort of Areemba on the main land at the southern part of this inlet or harbour.

Aswatada or Querimba Islands.

THE ASWATADA or QUERIMBA ISLANDS form a chain, extending along the coast from Point Areemba to Cape Delgado. A ship in coasting along, ought to keep 5 or 6 leagues from the main, or rather more in some places, as several of the islands and reefs extend from it nearly that distance, and no soundings are in general to be had at 1½ or 2 miles' distance from the edges of the reefs.

The following remarks are by Captain Owen :—

" The outer coast line of the Aswatada Islands and reefs, and the course from Cape Delgado to Cape Maunbané, or Devil's Point, is *true* South 45 leagues; in this distance there are eighteen or nineteen openings through the outer reefs into a still greater number of secure ports or convenient anchorages."

" The general character of these islands and their reefs is, that the sea faces are very steep, having rarely any practical soundings even alongside them: but no sooner has a vessel passed within the imaginary line between their extremities to seaward, than soundings may be expected, and generally in reasonable and convenient depths."

" The dominion of the Portuguese seems to be acknowledged by the natives as far as lat. 11° S., but not to the northward of that, where the whole coast is subject to Seuheli chiefs or to Arab usurpation."

" The Aswatada Isles are generally low, but some have a diversified surface of hill and dale, and many are mere coralets. They were most of them in high cultivation

about a hundred years ago, but having been so long open to Arab and Malgash depredation, they have returned to their pristine wilderness state; they are consequently in general well wooded and easily seen from seaward. But as no soundings are to be had to give notice of approach to them, it would seldom be safeto try to make them by night. Indeed this observation applies generally along the coast from Maleenda to Mozambique with a few exceptions. The outer coral reefs of Aswatada do almost all of them dry at low water, or at half-tide, like those of Cape Delgado."

Querimba. The larger islands of this group are situated between lat. 12° 10′ S., and 12° 27′ S., and to these, rather than those farther North towards Cape Delgado, the name of Querimba Islands belongs. That called Querimba, which gives name to the whole, is in lat. 12° 26° S., lon. 40° 39′ E., being about 3½ miles in length, with a fort near the north point of the island, which is in lat. 12° 23¾′ S.

Ibo Island. Ibo, on which the capital of the same name is situated, in lat. 12° 20′ S., is nearly separated into two islands by a deep inlet from the N.W., and the south part of the Island of Ibo is called Quirambo, this part being joined to the north point of Querimba by islets and rocks. To the North of Ibo there is a channel with 6 and 7 fathoms water, leading to anchorage inside the reefs; this channel is bounded on the south side by a reef projecting from Ibo, and on the north side by Corea de St. Gonzalo reef, which has another smaller channel between it and the reef that projects from the south end of Matemo. The reefs may be perceived by discoloured water, and outside of them a ship may anchor in a case of necessity, and also off the edge of the reef joining Ibo and Querimba, in calms. (Anchorage.) The anchorage at Ibo is partly exposed to easterly winds, where large ships would not find sufficient depths of water, and seems only proper for small ships drawing 14 or 15 feet, which might find good shelter by anchoring inside of Ibo reefs. (Tides.) It is high water about 4 hours on full and change of the moon. This, and the other islands, to the southward, are mostly connected by reefs.

Matemo Island. Matemo Island, in lat. 12° 13′ S., its centre bearing *true* North from Ibo, has a channel within it, with from 3½ to 7 fathoms water, and passages both to the North and South, between its surrounding reef and the adjacent reefs, with 7 and 10 fathoms water in them.

Mahatoo. Mahatoo Island, in lat. 11° 59′ S., the next to the northward of Matemo, has also a passage for small vessels inside, between it and the isles or reefs fronting Pangane Point on the main.

Coast from Ibo to Cape Delgado. From Ibo Island, the numerous islands and reefs fronting the coast extend nearly true North to Cape Delgado, and the coast in some places has various undulations, forming large bays, with some safe harbours inside the islands and reefs. The whole of the coast is generally low, with many small islands and reefs fronting it; a ship should, therefore, preserve an offing of 5 or 6 leagues in sailing along, to avoid the dangers which lie scattered in this space; more particularly as the land can only be seen at a small distance. The country vessels pass inside the islands and reefs, in sailing from one place to another.

Shanga anchorage. About 10 leagues to the northward of Ibo, in lat. 11° 50′ S., there is anchorage between the main land and the isles and reefs of Mattos and Shanga, which may be entered either from the northward, or southward, there being two channels, with depths of 14 to 9 fathoms in the southern one, between the main land reef projecting from Point Peguin, and those mentioned above.*

* The Margaret, of Calcutta, Captain Georgeson, from the Cape of Good Hope, bound to Zanzibar, April 2nd, 1819, struck and bilged on a reef in lat. 11° 27′ S., lon. 40° 42′ E. At 4 P.M., Mast Island was seen bearing N. ½ E., hauled up N.E. by N.: at 6 abreast of Mast Island about 3 or 4 miles' distance, saw a reef

CAPE DELGADO, in lat. 10° 41′ S., lon. 40° 40′ E., by Captain Owen's survey, being rather a low point, is not easily distinguished from the islands to the southward, the nearest of which, Tikomadjy Island, is distant from the cape about 4 miles. As the cape land on the south side, stretches westerly about two leagues, and then rounds to the southward, a safe bay or harbour is formed on the west side of the Island of Tikomadjy. The channel into this bay is formed between the island and the land of the cape, with depths from 30 fathoms at the entrance, to 7 or 6 fathoms inside: the course in is W. by N. ½ N. and W. ½ N., and mid-channel is the best track, as a reef projects from the cape, and another from the north part of the island; when round the latter, haul to the S.W. and anchor near the west point of the reef that projects from the island; or in northerly winds, a ship may anchor in the N. Western part of the bay in 5 or 6 fathoms, about 5 miles W. S. W. of the cape, opposite to Minenene River. Tonchy Fort is 3 or 4 miles to the westward of Cape Delgado, in the northern part of the bay. *Cape Delgado. Bay.*

A reef projects from the cape into the sea, and from hence the land takes a northerly direction to Mizimbaty Island in lat. 10° 20′ S., and becomes higher in several places than to the southward of the cape, with indentations in the coast, which is lined by reefs at a considerable distance from it in a N.W. direction nearly to Lindy River. About half-way between Cape Delgado and Keelwa, near Lindy River, there is a remarkable mountain, with three elevated hummocks on it of a hemispherical form. From the North point of Mizimbaty Island, other smaller islands extend in a north-westerly direction, about 6 miles parallel to the coast, chained together by reefs. *Reef.*

MONGHOW RIVER, entrance in lat. 10° 7′ S., lon. 40° 2′ E., is about a quarter of a mile wide between the sands and reefs at the entrance, rather difficult of access, with from 14 to 7 fathoms in the fair channel; this place is not easily distinguished. If a vessel intend to touch here, the entrance is seen from the northward, and when within 2 miles of it, the Mushroom Rocks, three in number, will be perceived on the reef outside the river's mouth on the western side of the channel, appearing like the wreck of a ship; bring them to bear S.S.W., and steer for them, till they are distant about half a mile; and pass between a third and a half mile to the eastward of them, when the river will be seen open to the S.S. Westward, and then continue to steer up in mid-channel. A ship may anchor in it, and warp up if the wind be light or baffling; then moor above the village of Monghow, which is a little within the eastern point of the river; or she may go higher up, where there is more room, and be land-locked. The depths in the river are mostly from 8 to 12 fathoms up to the anchorage; and it is high water at 4¾ hours on full and change of the moon. Wood is easily procured, but water with difficulty. The Arabs trade to this place for ivory, and slaves are sent from hence to Quiloa. *Monghow River. Directions. Anchorage. Tides.*

projecting from the N.E. end of it, about 3 miles in a N.E. direction, hauled up N.E. ½ N. At 7¾ saw breakers on the starboard bow, immediately struck on a reef, which at day-light was found to extend in shore as far as the eye could discern, and outside the ship in an easterly direction about 4 miles, then stretching to the northward. From the wreck, Mast Island (which we had passed the preceding evening) bore about S.W. by W. 10 or 12 miles, another island N.W. ½ N. about the same distance, and the main land to the westward about 7 or 8 leagues. Captain Georgeson says, that from lat. 12½° S., the land should not be approached nearer than just to see it in clear weather, until in the latitude of Cape Delgado; from hence to lat. 7° 47′ S. is safe. The crew of the Margaret coasted along in the boats to Zanzibar, where they arrived 14th April, or nine days after leaving the wreck, having experienced much embarrassment by falling in with reefs, sand banks, and islands, on several of which they got a little fresh water. The Arab Governor of Zanzibar treated them with great hospitality, furnished them with a house, provision of the best quality procurable, and afterwards gave them a passage to Bombay in one of his own Dows, free of expense.

Lindy River.

LINDY RIVER, in lat. 9° 59′ S., lon. 39° 45′ E. (the Fort), by the survey, about 5 or 6 leagues from Monghow, and 22 leagues to the N.W. of Cape Delagdo, is large, easy of access, with several villages on its banks, the principal of which is Lindy, with its fort on the western side, where the river contracts to about half a mile; from 2 miles' width, to 3 miles outside in the entrance. The southern shore ought not to be approached close; mid-channel is the best track, when a little inside of Point Querimba, which is the outer point on the north side of the river. The depths are 40 fathoms, no ground between the outer heads at the entrance, decreasing quickly to 8, 5, and 4 fathoms, at 2 or 2½ miles from the narrow part opposite to the village of Lindy. By Captain Owen's survey, this appears to be an excellent harbour; wood, water, and other necessary supplies may be easily procured; and the watering place is a little outside of Lindy, on the opposite shore, in a creek near Esmant village. Capt. Owen says, " there is good anchorage in the outer bay wherever soundings may be had, and about a mile North of Point Esmant, is a very good stopping place in 4 or 5 fathoms."

Tides.

It is high water at 4¼ hours on full and change of the moon, and the rise of tide is 12 feet. Variation 16° W. in 1824. From Lindy River to Keelwa, the coast extends about N. by W. 18 leagues, having some indentations, among which are Masoonga River in lat. 9° 45′ S., lon. 39° 47′ E., and Kisoohara River in lat. 9° 26′ S., lon. 39° 39′ E.

Keelwa Harbours.

KEELWA or KEERWA, sometimes called QUILOA, HARBOURS, are formed by the island of this name, which appears like two islands when seen from the offing; it is 4 miles in extent from North to South, and on the N.W. end the town and fort of Keelwa are situated, in lat. 8° 57′ S., lon. 39° 34′ E. There are two passages into this port, which form two harbours, one to the northward and one to the southward of the island, having from 20 to 8 or 10 fathoms in the latter, and from 30 to 12 fathoms in the former, either of which may be chosen as circumstances require. Ships entering the

Northern Channel.

northern harbour, the channel to which is about half a mile wide between the reefs at the entrance, usually anchor at the N.W. part of the island, abreast of the fort and town; those which come by the South channel, anchor to the southward of the island, in 9 or 10 fathoms in the southern harbour.* A bank of shoal water extends from the N.W. point of the island to the peninsula of the main land, having only 1 and 1½ fathoms on it at low water, but small vessels may pass over it at high water, from the north to the south harbour, as the tide rises 8 or 9 feet. Two spacious inlets or arms of the sea extend inland; one from the North harbour in a N.W. direction, and the other from the south harbour, in a South direction, both having in them several islets and shoals, with depths of water sufficient for ships of any size to a considerable distance upward, where they both separate into small branches or rivers. Two peninsulas are formed between the inlets and the sea, Keelwa Island almost filling up the space between the extremities of these peninsulas. The island is nearly surrounded by a reef, and the points which form the entrances leading to the harbours have reefs projecting

Ukyera Reef.

from them. The reef called Ukyera Reef, projecting from the north entrance point of the northern harbour, extends about 5 miles to seaward in an easterly direction, and is quite steep on its east and south sides. It has many spots on it always dry, on some of which are trees, and the entire surface of the reef, which is very extensive, is either dry or awash at low water ordinary tides. This point, called by Capt. Owen Cape Keelwa, is readily known, being low and sandy, with several trees near it on the inner

* Or when inside of Soonga Manara Point, they may haul to the southward and keep near the eastern side of the inlet or gulf, and pass about mid-channel between Isle Morice to the westward and the eastern shore, then anchor in 5 to 8 or 10 fathoms to the southward of that island, land-locked if necessary; but a great reef projects from the island in a northerly direction.

part of the reef. The south entrance point of the southern harbour, is also low, but distinguished by a pagoda on it, which at a considerable distance appears like a vessel under sail; it is called Soonga Manara, or Pagoda Point, and is situated in lat. 9° 2′ S., lon. 39° 37′ E., by Captain Owen's survey. To the northward of Ports Keelwa there are several hills inland, called by Capt. Owen the Vidal or Ganghera Hills, but all the coast about this harbour is low, covered with mangroves, which, retaining the mud, make banks and islands, rendering it unhealthy. Water and provisions may be procured at this place, but few ships touch here at present. The natives have in general been considered unfriendly to strangers. High water at 4 hours 45 minutes. Variation 14° 6′ W. in 1824. Captain Owen calls the northern harbour of Keelwa Port Beaver, and the southern one Port Nisus, from the circumstance of Captain Beaver, of H.M.S. Nisus, being the first Englishman who visited this place; his visit occurred in 1811. Respecting the name Quiloa, Capt. Owen remarks, that "by its literal enunciation to some Arab pilots, they took the Baracouta to *Tikéwéry* instead of Keelwa, from which it must be seen how important it is not only to give true names but the true pronunciation of them." He gives the following directions for the ports. Supplies. Tides.

"Coming from the northward the sea board of Ukyera Reef is as easily distinguishable by day as the shores of the land, and it may be coasted as close as convenient. No soundings will be had near it until approaching its south point, which has soundings more than half a mile on its S. E., and nearly half a league from the shore of Cape Keelwa; this is a convenient spot for anchorage sometimes in the northern monsoon, when there is not day enough to enter the ports." Directions by Capt. Owen.

"Easterly winds prevail here in the form of strong sea-breezes most of the year, and generally occasion a considerable swell from sea-ward, so that if the wind fall light and be from sea, and a ship be embayed here, it is sometimes a difficult and anxious work to get out; this consideration gives more importance to the only ground, just named, where a vessel can possibly anchor."

"To enter Port Beaver, bring the fort just on with the north extreme of Point Philip (the N. E. point of Keelwa Island) about West, until the cliffs of Cape Keelwa be shut in behind its S. E. extreme point, or be in one with it; then steer W.N.W. for the second break in the shore, North of Point Emerika (the South point of the northern peninsula): this with open eyes will lead clear through the narrows, until the castle islet, which is off the fort, be shut in behind Point Emerika, when a ship may steer in mid-channel towards the fort." Port Beaver.

"There is a small shoal on the north part of Philip Reef, and another on the south part of Cape Keelwa Reef, which form the narrows, where the channel is not more than a quarter of a mile wide. Strangers had better place a boat on the edge of each of these shoals for marks, and when within the narrows, the cliff being open to the West of the N.W. Point of Philip, a ship may steer as she will, the North shore of Keelwa Island being clean almost to the town, as is also Point Emerika; but the shores on the east side of this point are foul, except near the North Cliff. A vessel when inside may choose her anchorage, but the most convenient depths are North of the fort."

"To enter Port Nisus, the channel between the reefs off Fishery Point (the S. E. point of Keelwa Island) and Pagoda Point is three-quarters of a mile wide. Enter at half tide or low water, and the way will be clearly seen. The most convenient anchorage is about midway from the south shore of Keelwa Island, between it and Pactolus Bank, but vessels sometimes haul close within Pagoda Point, and anchor between it and Morice Island." Port Nisus.

"If a ship desire to enter in the southern monsoon or from the southward she should make the land about Rohanga or Kishoohara to the southward, where the shore is very clean and land high and bold; and coast the reefs northward and enter by eye, or when Fishery Point bears W. by N. she may steer for it until Morice Island bears S.S.W. and then proceed as before."

Monfea. MONFEA ISLAND extends from lat. 8° 2′ S., to Point Moresby, the North extreme in lat. 7° 38′ S., lon. 39° 57′ E.; it is narrow, and the first large island to the northward of Keelwa, but between them a chain of islands and reefs extend along the coast at the distance of 5 to 6½ leagues, with a channel inside for small vessels. Monfea is also fronted by a reef along its eastern side, and by islands and shoals on the inside, between it and the main. There is anchorage on its South and West sides, betwixt the reef which extends from it, and the adjacent group of islands and shoals. Care is requisite in approaching the southern part of the island, on account of extensive and steep coral reefs. The island is said to be fertile, and to afford water and provisions.

Point Ponna. Between Monfea and Zanzibar, there are several islands near the main, and a passage along the coast, inside of most of them, fit for small vessels. Point Ponna in lat. 7° 1′ S., lon. 39° 37′ E., is a projecting part of the land, nearly opposite to Latham Isle, from which point the coast takes a N. Westerly direction for 21 leagues, forming the Bight of Zanzibar.

Latham Isle. LATHAM ISLE, in lat. 6° 54′ S., lon. 39° 59′ E., by Captain Owen's survey, and in lat. 6° 59′ S., lon. 39° 50′ E., by Captain Moresby's observations in 1822, in H.M.S. Menai, bears nearly *true* North, 44 miles distant from the north end of Monfea, and is a low sandy island, less than a quarter of a mile in extent, with a rocky projection from the eastern part, and usually high breakers on the rocks around. A bank of soundings from 5 to 15 fathoms extends about 2½ miles to the northward of the isle, and to the eastward about 1½ miles, with from 6 to 10 fathoms on that part, but half a mile from the isle on the west side, there are 28 and 30 fathoms. This isle was discovered by the East India Company's Ship, Latham, December 8th, 1758, and is marked in her journal to be about 14 feet above water, in lat. 7° S. Captain Owen states it to be about 10 feet elevated above high water mark, formed of coral, and its surface is rendered flat by the dung of the numerous sea fowl which resort to it. Except on the S.W. side, it is difficult of access. Variation 13° 5′ W. near it in 1824.

Zanzibar. ZANZIBAR, called ZUNGBAUR by the Arabs, the largest island on this part of the coast, has a considerable trade carried on by the Arabs from Muscat,* who also trade to most of the harbours on the east coast of Africa, for ivory. The east side of the island is lined by a reef, and on the western side are several small islands and shoals between it and the main land; reefs also project from the north and south extremities of the principal island.

Directions. A ship intending to touch at this place, should steer for the north part of the island, and when off the N.W. end, two islands will be perceived near each other within the northern point, the southernmost of which, called Tumbat or Tombette, is largest, being of considerable extent North and South; the other, called Moina—Moina, is small, and lies close to the North point of Tumbat: if it be late in the evening, she may

* Zanzibar is tributary to the Imaum of Muscat, who keeps an Arab Governor there.

anchor near the west side of Tumbat, in muddy ground, from 17 to 20 fathoms. In running along the west side of Tumbat, the soundings are regular, at the distance of 1 or 2 miles from the shore, and the course about S.S.W. and S. by W., but about $2\frac{1}{2}$ or 3 miles to the westward of its north end, there are overfalls of 9 or 10 fathoms. From the N.W. end of Zanzibar, called Sandy Point, or Point Ooswamemby, a bank is said to extend in a S.W. direction about $1\frac{1}{2}$ miles from the shore, having on it 7 fathoms, fine sand; when past this bank, there are regular soundings along the western shore to the three islands situated to the northward of the town. Outside of these, a ship may anchor, or go into the inner harbour at once; the dangers are generally visible, particularly at low water; and although the pilots use no marks to carry ships into the harbour, the following directions may be of utility.

When you come near the easternmost of these three islands, called Chapany, or French Island, you will see the bank extending from it, which is partly dry at low water, and by projecting nearly half-way across, towards the Zanzibar shore, makes the channel very narrow. There is also a bank projecting a small distance from the main island, and forming an elbow along that shore. When you come near this bank, the south point of Zanzibar Town will be open with the eastern island; on this south point there are three remarkable coco-nut trees,* and a white house near them. Keep the second or middle tree on with the white house, and you will be in the best water, 8 and 9 fathoms. When the three islands before mentioned are in one, you are abreast the bank, and will have 6 fathoms, one or two casts; when the islands appear open of each other, you are past the shoal part of it, and may then steer for the south point of Zanzibar, leaving an elbow of a bank near the shore on your larboard hand, and anchor within a mile of the town in 7 fathoms mud. The south point of Zanzibar will then bear S. by W. $\frac{1}{4}$ W. with a small island a little open; the flag-staff on the Fort, or Governor's House, S. $\frac{3}{4}$ E.; the fresh water river E. by N. 4 miles, having a single coco-nut tree on the summit of the hill, a little open to the left of it; Chapany Island, from which projects the bank, N.E. $\frac{1}{2}$ N., and the second island having the N.W. end of Zanzibar just open of it, N. $\frac{1}{2}$ E. The reef environing the islands is mostly dry at low water; and at high water only navigable by boats.

In running along the S.W. part of Zanzibar, the western side of the channel is bounded with reefs extending about North and South, which are nearly dry at low water. There is a village and some fishermen's huts near the N.W. part of the island; and the town is composed of few houses, the dwelling-places being in general huts constructed of mat, which are very neat. The island in sailing along has a beautiful appearance, and is every where woody.

The channel to the westward of Changoo, the north-westernmost of the three islands, seems safe, by passing that island on the west side at a little more than half a mile distance, and as a reef extends nearly $1\frac{1}{2}$ miles S. by W. of it, give the reef a berth, by keeping rather more than mid-channel toward Bawy Island to the S. Westward, and when abreast of this island, or on the transit line between its north end and Zanzibar Fort, or the middle of the town, steer on this transit line for the anchorage abreast the Fort and Town.

Water may be procured in Fresh Water River, but it must be filled on the falling Water.

* These marks, given by Captain Bissell, were not visible when Captain Moresby was here in 1822, who observes, in his directions for this place, that the eye is the best pilot. He also found the island marked as Tree Island, in the plans of Zanzibar, does not now exist, the sea having undermined the coral rock which formed it, and finally reduced it to sand, where at low water it forms a bank, called Harp Shell Bank by Captain Moresby, from the numerous and beautiful shells found on the reefs surrounding it.

tide, being brackish at high water.* The casks are rolled a considerable distance from the beach, filled from the stream, and taken off on the flood. Water may also be got from a well about a quarter of a mile round the south point of the island, to which the boats may make three or four trips daily. From religious motives, the natives will not permit European ships to receive a supply of water from the wells about the town.

Supplies. This place abounds with refreshments, bullocks, goats, poultry, rice, dholl, coco-nut oil, &c. with a great variety of delicious fruits. The Governor makes a monopoly of the sale of these articles, charging exorbitantly for them; the inhabitants, when permitted, sell their articles more reasonably. They go always armed, and appear timid, except when a considerable number are together.

The foregoing remarks relative to Zanzibar are mostly from the observations of Captain Bissell, taken in H.M. ships Leopard and Orestes, in February, 1799; which ships touched here for refreshments in their passage to the Red Sea, after having endeavoured in vain to beat up along the coast against the N.E. monsoon. They arrived the 19th of February, and sailed the 5th of March; and after passing along the coast from hence to Ras Jar d'Afoon, arrived in Aden Road the 11th of April.

Captain Moresby employed four boats constantly for eight days, in forming a survey of the channels and harbour of Zanzibar, for which he gives the following instructions.

Directions for the South Channel. On approaching Zanzibar from the southward, after passing Latham Isle to the westward, a point will be seen bearing S.W. by W., and farther North, land rising into two mounts, then the southern part of Zanzibar, and the islands that skirt the West; the reefs are discernible all the way, and with a good look out, it is impossible to run into danger. When the islands are passed, and open clear of the southern part of Zanzibar, Ile Passe, or Choomby, will be seen, having two small rocks off its S.E. end called the Twins; at the same time, Ukomby Isles, which are two small islands, called also Walnut and Nut Islands, will be seen to the eastward, situated on an extensive bank: Bawy, or Turtle Island, with the three islands that form the harbour of Zanzibar, in a clear day, being likewise in sight from the mast-head: having cleared Ile Passe, there are four channels by which a ship may proceed to the anchorage off the town. At low water all of them are safe, and may be adopted at discretion, as the banks and reefs show themselves, and are then steep to; but at half-tide, the Menai Channel is the best. To go through this channel, double Ile Passe at half a mile distance: when the North extreme bears East, and the town just on with the south point, steer N.N.E. in from 15 to 18 fathoms, at which time French Island will be seen from the mast-head, nearly on with the point of the town. On this course the soundings will decrease gradually to 9 or 8 fathoms, until Nut or Walnut Islands are in one. With Bluff Point bearing S.E., a patch of black rocks off Rocky Point E. by N. ½ N., the Town Point N.N.E. ½ E. nearly on with French Island, the Middle Ground, if at half tide, will be seen a wash, or at high tide the shoal water over it right

* Captain Owen observes, that the crews of all vessels, after having watered here, have been subject to dysenteries and fever; which applies more particularly to the river water, as that procured by digging, or from wells, does not appear to possess the same deleterious property. Europeans not seasoned to the climate, ought not to sleep on shore, if it can possibly be avoided. Captain Bissell made the anchorage in lat. 6° 6′ S., lon. 39° 33′ E. North end of the island in lat. 5° 40′ S., lon. 39° 46′ E.; and the South end in lat. 6° 28′ S., lon. 39° 46′ E. (*a*). Captain Smee, in the Ternate, Bombay cruizer, in 1811, made the town in lon. 39° 0′ E. by sun and moon. Captain Moresby, of H.M.S. Menai, made French Island, near the anchorage, in lon. 39° 1¼′ E. by lunar observations, and in 38° 57½′ E. by chronometers, in 9 days' run measured from Johanna.

(*a*) Which is too much to the eastward.

a-head about half a mile distant, and Menai Bank will appear on the starboard-bow, about a quarter of a mile, haul up N.E. by E. keeping Rocky Point on the starboard-bow, on which course there are from 7 to 9 fathoms until Rocky Point bears E. by S., three quarters or half a mile distant, then a ship will be past all danger, and may steer for Town Point, Middle Island being nearly on with it.

The Imogene frigate went out by the South passage, February 7th, 1834, which afforded the following observations, made by Captain Hart, in command of that ship. "Being half-tide, when all the shoals were visible, weighed at 8 A.M. from our anchorage to the northward of the town, off the Imaum's palace, having a native pilot, with no farther guide than his eye. Passed between French Island and the main of Zanzibar, but too close to the sand spit projecting from the former, upon which had one cast of less than three fathoms, and the next six fathoms. Afterward, hauled up a little to avoid the shoal that fronts the shore of the main island, then steered south-westward for the shipping off the town, passing close to them, and soon approached a dry sand bank which was visible before we weighed. This sand bank bounds the western side of a very narrow passage named Imogene Channel, to distinguish it from that named Menai Channel by Captain Moresby." Directions by Capt. Hart.

"When close to the sand-bank, bearing West, saw from the deck the shoal that bounds the east side of the channel, the width of which did not appear above twice or thrice the length of the ship. Rocky Point exhibits a white cliff more conspicuous than the rocks, and ought to be called White Cliff Point; it bore S.E. by S. when in 10 fathoms water in the channel, steering S. S. W. When the western sand-bank bears N.W. it is on with Bawy Island, by which this island may be known; and the eastern shoal is on with Isle Passe, bearing S.E. by S., and White Cliff Point then bearing E. by S., in 6 and 7 fathoms water, steering S.S.W. ½ W. The eastern shoal is on with Bluff Point, bearing S.E., the White Cliff will then bear East and be in a line with part of the same shoal, and Zanibar Town Point will bear N. by E. ½ E., the depth of water 10 fathoms."

"When the north part of Isle Passe is on with the south part of Nut Island, if entering from the southward, White Cliff Point will appear bearing N.E. The north point of Isle Passe and White Cliff Point are in one bearing, N.E. ¾ N., Walnut Island then bearing East, will be 1½ points of the compass open with a high conspicuous clump of trees on Zanibar, and Kwaly Island will bear S. E. ½ S. The high clump of trees bears E.N.E. ½ N. in a line with the 3 fathoms shoal, Isle Passe then bearing North, Walnut Island N.E. ½ N., and a small round island E. by S., which shoal appeared to have less than one fathom water on it."

"Approaching from southward, the south part of Zanzibar, bearing N.N.W. 5 leagues, may be known by a high top of trees, appearing separate and higher than the others; and Kwaly Island will be known when it bears North 10 or 12 miles, by a white sandy point, and a little round island then appearing to the eastward of it, the south point of Zanzibar bearing E. by N. When Kwaly Island bears N.E. ½ N. it may be known by the little round island appearing off its northern point, with another small flat island to the northward of the round island, about 5 times its length, the south point of Zanzibar bearing East."

"The pilots trust to the eye, the shoals being visible at half-tide, and at all other times from the mast-head. The Imogene entered by the north passage in the N.E. monsoon, and could not obtain a pilot. The country vessels, large and small, enter or depart by the southern passage, according to the season."

"To pass between French Island and Zanzibar from the anchorage before the Fort, To sail out to the northward.

in proceeding out by the northern passage, the best time to weigh is at half-ebb, when all dangers are visible; a course N.E. by E. a little easterly, will skirt the Flats about a musket-shot, extending from the mouth of the river; or when the two flag-staffs are in one, and a large white house on with the curtain between the two northernmost towns of the Fort, a ship is in the fair channel in 6 and 7 fathoms water: keep these on until the three islands, French, Middle, and Changoo, are in one, then the Longsand Spit extending from French Island will be abreast, round which gradually haul, to avoid a flat stretching from the river Amousi; and when this is passed, a ship may steer North, having 8 fathoms, gradually increasing over a bottom of mud." Captain Owen's survey made the Town Fort in lat. 6° 9½′ S., lon. 39° 14½′ E. North Point in lat. 5° 42¾′ S., lon. 39° 20½′ E. Ras Kizimkaz or South point in lat. 6° 27¾′ S., lon. 39° 33′ E. Chuaka or East point in lat. 6° 3¾′ S., lon. 39° 31′ E.

Tides. High water at 4 hours 45 minutes on full and change of moon. Rise of tide 9 or 10 feet. Variation 11° 7′ W. in 1823.

The following are Captain Owen's directions for the anchorage:—

Directions by Capt. Owen. "In the N.E. monsoon a ship may round the north point of the island at any convenient distance, and leaving Moina Moina full a mile or more to the southward, until the western coast of Tumbat is all open; she may then coast that island at a mile distance, more or less, and will carry from 16 to 20 fathoms, except in crossing Tumbat West Bank, should she be far enough for that. Rounding Ooswamemby in like manner, she will carry soundings all down the western coast from 24 fathoms, decreasing gradually to the southward. She may now enter either by English Pass within all the islets, or by the Great North Pass between Changoo and Bawy Islands. If by the former, the reefs will always be clearly seen at half-tide, and she may haul in for Cliff Point, which is full a mile E.N.E. of Chapany Islet, until she be in from 7 to 9 fathoms. She may then steer by the eye, keeping about three times as far from Chapany Islet as from the main shore. When the three northern islands are in one, she will be in the narrowest part of the channel, and must then haul out to the westward, so as to get mid-channel between Chapany and the Zanzibar shore, when the former bears N.N.W. She may then choose her berth at pleasure at any convenient distance off Point Shangany."

"In the southern monsoon, it is better to make the land about Point Ponna, from which steer North or N. by W. to make Kizimkaz; thence steer for Kwaly Island, and round it, and Choomby, at a convenient distance; steer for the rocky capes Maja or Chakwany, until Choomby bears S. ½ W., and Chakwany from E. by N. to E.N.E.; then steer N. ½ E. with Chapany just shut in with Shangany, and when Chakwany bears E.S.E. steer as convenient for any required berth; observing, in coming in or going out, that if the Little Larkbree* sand is seen, it will be a sure guide, the channel being between it and the Maja Bank. The Little Larkbree may be approached by the lead."

After leaving Zanzibar for Pemba, having run eight miles N. E. ¾ E. from the former, Captain Moresby, in the Menai, suddenly struck soundings in 14 fathoms, and had afterward from 6½ to 13 fathoms uneven ground, steering E. by N. 6 miles, the north point of Zanzibar bearing S. 26° W., and the east point S. 3° E. off shore about 10 miles, then suddenly lost soundings in steering out E.S.E.

* This little sand-bank is generally dry, and is situated 4 miles *true* North of Choomby Island and 1½ miles *true* West of Chakwany Point. Larkbree, according to Captain Owen, was the name of the Arab Governor.

PEMBA, called KEDDREE, or UL HUTHERA (Green Island), by the natives, extends 12 or 13 leagues, nearly N. by E. and S. by W. The Point Kegomatchy, N.W. point being in lat. 4° 52′ S., lon. 39° 44′ E. The south end in lat. 5° 29′ S., lon. 39° 42′ E., by Captain Owen's survey. This island is low, well wooded and fertile; rice is cultivated and carried to Zanzibar: the eastern shore is nearly straight in a N.N.E. and S.S.W. direction, and is lined by a reef, requiring caution when near it in the night; the western shore is irregular and deeply indented in its outline, having a chain of islands and reefs fronting it, by which several bays and harbours are formed. The chief of these, Chakehak Bay,* is inside Mesal Island, in lat. 5° 15′ S., from whence a channel leads to Port Cockburn, situated on the north side of a long narrow peninsula that separates them. Port Campbell is in lat. 5° 4′ S., having also a channel leading from the former harbours, which channel extends inside the chain of islands and reefs nearly to the N.W. end of Pemba, and there are several gaps in the chain, also affording a passage to the harbours inside the islands and reefs. Pemba. Chakehak Bay. Ports Cockburn and Campbell.

There is a channel betwixt Pemba and the main, but it is contracted by reefs on each side, for, opposite to this island, a chain of reefs and islets project 2 or 2½ leagues from the main land in some places, very steep to.

In August, 1822, Captain Moresby, after departing from Zanzibar, passed in the Menai on the west side of Pemba, between it and the main, and made the Western Reefs in lon. 39° 34′ E. When within 3 or 4 miles of the island, he steered N.N.E. ½ E. in an open channel, on a line with the reefs, until the north end of Pemba bore S. 20° E., and got no soundings with the deep sea lead; but at this time the man in the chains got ground 7 fathoms, when the ship was immediately hove to, and no soundings obtained with 80 fathoms of line: probably they had passed rapidly over a small bank. The current in the channel appeared to run with great force, violently agitating the sea; and the western side of Pemba was found to be fortified by coral reefs, interspersed with islands, and whenever a sand bank intervenes there is generally good anchorage. On the western side of the N.W. point, a ship may anchor opposite to a small sandy bay, but a reef of 2 miles' extent to the N.E. must be avoided. High water at Mesal Island, at 4¼ hours on full and change of moon; rise 12 feet. Tides.

MOMBAS ISLAND lies about 16 leagues to the northward of Pemba Island, and is about 3 miles long from North to South, and about 1½ miles broad, nearly filling the large basin formed by the main land, and having a channel on each side leading to the interior ports. The main entrance is about 1½ miles wide between the outer reefs, which, together with the south end of the island, form the outer bay or road, which has in general from 6 to 9 fathoms depth of water, with some deep holes of from 18 to 35 fathoms, and a shoal patch with less than 4 fathoms. This road is convenient in the northern monsoon, the water being generally smooth, but in the southern monsoon a considerable swell sets in. The channel on the eastern side of Mombas Island, and which leads past the city, terminates at the north end of the island in the harbour called Port Owen Tudor by Captain Owen, at the head of which are the entrances of several rivers. The western channel does not continue round the N.W. end of the island, but bending suddenly due West, opens into the larger harbour of Port Reitz. Mombas.

* Captain Owen calls this, Masal Ul-Chak Chak, a fine port, affording good and secure anchorage; the island is also very fertile, abounding in excellent ship timber and refreshments.

The City, Castle, and Fort, are on the east side of the island, a little within the north-eastern channel, where ships may procure refreshments: fresh water may be got from wells in different parts, more particularly about a mile above the city on the eastern shore, and the anchorage is safe. Between the two reefs which form the entrance, the depths are from 6 to 10 fathoms, continuing nearly the same to the city, and deepening afterwards along the east side of the island; on the south side of the island, between it and the south reef, the depths are rather greater, and this part may be called the Southern Harbour. Mombas Island and the contiguous land are low and woody; a pillar on the east end of the island, or the flag-staff of the fort, may be perceived in passing, but the city is obscured by trees: there are three remarkable hummocks to the northward of this place, called the hummocks of Mombas, by which it may be easily known. By Captain Owen's survey, the entrance of the harbour is in lat. 4° 3′ S., the fort in lat. 4° 4′ S., lon. 39° 43′ E. Variation 11° W. in 1824. High water at 4 hours on full and change; rise of tide 11 feet. The port, although safe inside, is rather difficult of access, on account of extensive reefs, and the natives are not always friendly to Europeans. Since the Arabs and natives expelled the Portuguese from the ports on this part of the coast, few European vessels touch at any of them. Zanzibar is preferable to other ports on this coast, if a ship be in want of water or other refreshments; there is less chance of treachery, it being under the government of Muscat, and more civilized.

Tides.

Owyombo, or Chenee River.

OWYOMBO, or CHENEE RIVER, in lat. 3° 37′ S., bears *true* N. by E. from Mombas, distant about 9 leagues, having soundings of ten fathoms close to the entrance; and a reef steep to lines the shore between these places.

Killeefy River.

KILLEEFY, or QUILIFE RIVER, is situated in lat. 3° 39′ S., lon. 39° 53′ E., and the shore becomes dangerous a little to the N. E. of this river.

Port Maleenda.

PORT MALEENDA was surveyed in 1823 by the officers under Capt. Owen, and is formed by Leopard Reef on the outside, and the other reefs contiguous to the main, having depths of 4 to 8 and 9 fathoms; there is no town marked on the plan engraved from the survey. Leopard Reef, in lat. 3° 16′ S., lies about 7 leagues N. E. from the entrance of Killeefy River, where H.M.S. Leopard was 6 hours aground, and nearly lost, 15th Feb. 1799. Steering S.W. by W. and W.S.W. the land was seen at 3 A.M., sounded in 13 fathoms, and afterwards struck, in hauling out to sout-eastward. After floating at 9 A.M., she anchored in 17 fathoms fine white sand, a little to the south-eastward of the reef, and observed at noon in lat. 3° 18′ S., the southern extreme of the land then bore W. by S., the northern extreme supposed to be the South Point of Formosa Bay, N. by E. 6 leagues, and an island having a pagoda,* or sea mark on it, N.W. by N. distant 5 miles. This reef extended about N. N. E. and S.S.W., having high breakers on the shoal parts, and terminated at the main. All the shore in sight to the westward seemed to be bounded by other reefs, parallel to that mentioned, and were nearly dry.

Leopard Reef.

Other reefs near it.

The Pagoda is called by Captain Owen, Vasco da Gama's Pillar, and according to

* This is called Gomany Pagoda by Captain Smee, who made a running survey of the coast in 1811, and states it to be on a point of the main; he places the Leopard Reef in lat. 3° 15′ S., and says that a ridge of high land is in one with the reef bearing W. by N. ½ N. Killeefy River he made in lat. 3° 26′ S., and describes it to be large, with a bold shore near it, without soundings.

him is built on the north end of a flat peninsular rock, which is about a quarter of a mile long from N. N. E. to S. S.W., and 150 yards wide. Inside the rocky peninsula is a small cove, and between the point which forms the western side of this cove and the main is another cove—both coves are open to the North and N. E. The Pillar is in lat. 3° 13′ S., lon. 40° 11′ E.

Formosa Bay.

FORMOSA BAY is about 9 leagues in breadth, and 3 or 4 leagues deep, having various soundings from 25 to 8 and 6 fathoms; the southern point of this bay, called Ras Gomany, is in lat. 3° 0′ S., lon. 40° 19′ E., by the survey; and the North point is in lat. 2° 39′ S., lon. 40° 40′ E., having detached reefs fronting it, to the distance of 4 miles, with depths of 14 and 16 fathoms near them; and there are also reefs in the S.W. part of the bay 3 and 4 miles off shore, in the stream of 8 fathoms.

The coast from Formosa Bay to Patta.

From the North point of Formosa Bay, the coast extends in a N. E. direction, about 11 leagues, to Patta; all the land being rather low, and to the southward of Patta there is a chain of five islands covered with trees.

Lamoo.

LAMOO TOWN and CASTLE, in lat. 2° 16′ S., lon. 40° 56′ E., is situated about 3 leagues to the S.W. of Patta on the east side of Lamoo Island, which is separated from Manda Island by an arm of the sea, forming a secure harbour for small vessels, although the entrance is intricate.

Lamoo Bay, formed by Manda and Lamoo Islands to the northward and westward, and the main land to the south-westward, has a depth of water from 4 to 10 fathoms, the usual anchorage off the harbour entrance being sheltered to the East and N. E. by Ras Kattow, the south point of Manda Island and its reefs, and to the North, West, and S.W. by the shores of Lamoo Island and the main. In the outer part of the bay, about 2 miles S. S.W. of Kattow Point, is a $2\frac{3}{4}$ fathom patch, called Kattow Knoll, and between 6 and 7 miles S.W. of the coast is the islet of Kinyeeka. To enter Lamoo Bay, Captain Owen observes: "In the northern monsoon, round Ras Kattow by the lead in a convenient depth, over 5 fathoms, and do not come under that or $4\frac{1}{2}$, until the point bear E. by S. about a mile off shore, where anchor. The channel into the river is narrow, a ship desirous of entering should sound it, and place boats or marks on the shoal points."

Capt. Owen's directions.

"With the southern monsoon the islet of Kinyeeka may be passed, on either side, when a ship may steer for Shella Castle, which is near the S. E. point of Lamoo Island, or the eastern sand-hill off Lamoo Island, or rather leaving them one point on the starboard bow, until Ras Kattow bear E. by S. (as before), a full mile off the shore of Manda, where she may anchor, where the whole bay is safe from Kinyeeka Islet or rock to the bar flat, half a mile off the south shore of Manda. The spit W. by N. of Ras Kattow, near three quarters of a mile from its shore, requires caution; it has $2\frac{1}{2}$ fathoms, and Shella Castle bears N. 36° E. from it."

Patta.

PATTA, in lat. 2° 9′ S., lon. 41° 2′ E., is built on a mud flat, which according to Captain Owen is overflowed at high water, having a boat channel through it to the town. The Bay is protected by extensive reefs, which stretch along shore at the distance of 2 and $2\frac{1}{2}$ leagues from the land, having narrow passages between some of them. The middle passage has from 7 to 3 fathoms water in it, and was frequented by English ships formerly, when they traded to this place for cowries, ivory, &c. The Portuguese used the channel that lies 4 miles more to the westward; to the eastward

there is a winding channel with 3 fathoms water on the bar, said to be dangerous* from April to the latter end of August.

The following description and directions are taken from the remarks of Captain Owen:—

Patta Bay. Patta Bay is bounded on the N. E. by the reefs and sands of Seewy, on the S.W. by Manda Island, and to sea-ward by the Pesarly, Eyaya, and other reefs. The shores of the bay are all very low, but the S. E. shore of Manda Island has sand-hills of moderate elevation, its eastern point being a bluff headland, faced by a sand flat which extends towards the western rocks of Eyaya. The island of Kizingaty, which lies 2 miles E. S. E. of the town of Patta, is 2 miles in length from East to West, its southern face presenting a remarkable feature, being defended by a barrier of rocks a little separated from the shore. Patta East cliffs, which are 2 miles farther to the eastward, and Patta Middle cliffs, which are between the two, also present a similar structure.

Pesarly outer rocks have some heads which never cover with the tide. These rocks are very bold, and extend about 1½ miles from N. E. to S.W. The Eyaya reefs consist of two patches which have some rocks always shewing above water, and are joined by a rocky ledge which is always covered. The northern Eyaya is 2 miles West of the South Pesarly Rock and the southern Eyaya 2½ miles farther, and nearly in the same direction.

Two miles S. by W. of the North Eyaya is the outer dry rock and reef of Patta, which is a circular patch of half a mile in diameter, steep on all sides and having a deep channel nearly 3 quarters of a mile wide between it and the flats of Eyaya. The outer 4 fathoms banks are more than half a league S. by E. and S. E. by S. from the outer Patta rock, and the Manda 6 fathoms bank, a league S. S. W. ½ W. from it.

Capt. Owen's directions. "Coming from the northward with the N. E. monsoon, Seewy Reef may be coasted in from 12 to 14 fathoms, or keeping Kwyhoo Peak nothing to the eastward of N. E. by N. until the western extremity of Patta East cliffs opens to the southward of Seewy Reef. The reef may then be coasted at a convenient distance and at a convenient depth by the lead."

"If you desire to avoid the middle patch of 3½ fathoms, by passing to the eastward of it, the western extreme of Patta East cliff bears N.W. by N. from it and the channel between it, and the S.W. end of Seewy sand is clear half a mile wide. But it may by many be preferred to sound on this middle patch; the passage between it and the North Pesarly rocks is well open within or to the northward of the North Pesarly; a ship may steer as she will and choose any berth in Patta Bay, taking care to avoid the 1½ fathoms knoll; or steer for the eastern cliffs of Kizingaty Island from any part of the pass or channel between Pesarly and Seewy reefs, until the north rocks of Eyaya are on with the east bluff head or sand-hills upon Manda Islands, S.W. by W. ¼ W., with the southern rocks of Eyaya well open to the northward of the northern rocks. She may then steer W. S.W. for Albatross Mangrove Island; and anchor anywhere between the flat, which extends near half a mile South of Kizingaty cliffs and the North rocks of Eyaya: this part of Patta Bay is called Khor Eyaya; a reef extends two cables' lengths N. E. from the North rocks of Eyaya."

* The Ternate went in by this channel in 1811, and came out by the middle channel, where not more than 2 or 2¼ fathoms could be found. The chief of Patta endeavoured to deceive Captain Smee, although he had a letter from the Bombay Government; and after several days' delay, with some apprehension for the safety of his vessel, he was forced to leave this unfriendly place without obtaining any supplies.

"If a ship in the northern monsoon desire to enter Patta Bay by the channel, South of Pesarly rocks, she may coast that ledge as close as convenient, and haul into the bay, round the south end, steering for the east end of Kizingaty, until the northern Eyaya be on with the east bluff, and sand-hill of Manda, as before directed, and she may pass over or on either side of the middle patch of $3\frac{1}{2}$ fathoms, which is in this pass, likewise about mid-way, and in the same line as the southern Pesarly rocks and northern Eyaya rocks."

"There is another channel which had better not be attempted by strangers, between the Eastern shores of Manda and the southern rocks of Eyaya."

"If in the southern monsoon a ship be sailing into Patta Bay, after rounding Ras Kattow or the south part of Manda Island, she may steer N.E. by N. for the outer reef of Patta, and coast that on either side as convenient, then steer for the Pesarly rocks until the town of Patta be open to the north of the northern Eyaya rocks, bearing N.W. by N., when she may steer for the east end of Kizingaty, and proceed as before directed."

The soundings are 30 and 32 fathoms about 5 or 6 miles outside the reefs, and 9 or 10 fathoms close to them. Inside, near the inner edges, the general depths are from 5 to 7 fathoms, shoaling towards the island. The proper anchorage is within the reefs, about 8 miles to the westward of the eastern channel, near Kizingaty Island, which lies to the East of Patta, in lat. 2° 8′ S. It is high water at $4\frac{1}{2}$ hours, on full and change of the moon; rise of tide, 9 to 11 feet. Variation 10° W. in 1824. Tides.

KWYHOO BAY or ROAD is an anchorage at the entrance of a large inlet about 3 or 4 leagues N.E. of Patta. The entrance of the inlet is about 6 miles wide between Seewy Point to the S.W. and the South Point of Kwyhoo Island to the N.E. The inlet about 2 miles within the entrance is divided into two branches by the land or islands of Fazy. The South end of Kwyhoo Island projects to the S.W. in a long narrow point, having a ledge of rocks, and beyond the rocks a bank stretching off it between 3 and 4 miles in the same direction. These are called by Capt. Owen, Boteler's Ledge and Bank, between which and the N.E. end of the Seewy Reefs, is the entrance to Kwyhoo Bay. The bay has from 4 to 8 fathoms water, with the Seewy Flats, which stretch across the western branch of the inlet, forming its north-western boundary. Kwyhoo Bay.

Kwyhoo Island is faced by high sand-hills, and near its S.W. end is a remarkable peak, upwards of 200 feet above the sea, according to Capt. Owen. From this peak the island narrows into the long projecting point before mentioned.

Of Kwyhoo Bay, Capt. Owen remarks that "a ship stopping but a day or two will in the southern monsoon find the best anchorage under Seewy Reef on the West. But without the chart or a pilot ships in general should not try it; and it may be as well to mention that the chart will be a better guide than most of the pilots to be had here."

THE DUNDAS ISLANDS is the name given by Captain Owen to the chain of islands fronting the coast from Kwyhoo, in 2° S. nearly to the equator. They are generally narrow, having their length parallel with the shore, from which they are rarely distant more than 2 miles, and hence may sometimes be mistaken for the main land; there are reefs stretching out from, and uniting many of the islands, with fine bays or harbours among them. From lat. 1° 2′ S., to 0° 22′ S., a coral bank extends along the Coast from Kwyhoo to the Equator.

irregular chain of islands that fronts the coast; the outer edge of which is about 4 and 5 miles from the shore, and is steep to, the depth decreasing from 20 to 13 fathoms at one cast in standing on it, when a ship should immediately tack.

Durnford Port.

DURNFORD PORT and RIVER are situated about the centre of that interval of coast which is fronted by the Dundas Islands. The remarkable hilly peninsula of Boorgal is in the N.E. side, and between the ledge of rocks extending from the South point (called Foott Point), of this peninsula, and the opposite ledge, which terminates the reefs lining the S.W. shore, is the entrance channel to the port. It is about a quarter of a mile wide, with 5 and 6 fathoms water, and from 3 to 9 or 10 fathoms higher up towards the entrance of the river. There are some habitations on the western side, the largest village being 6 miles from the entrance.

The sand-heads on each side of the entrance dry at spring tides; the eastern sand-head lies about half a mile W. by N. from the South point (Foott Point), of Boorgal Peninsula, and the western one about a mile from the same point in the same direction. There is a small island on the western sand bank called Joyce Island, and on a point higher up some ruins, opposite which on the eastern side is Deep Water Point. About 2 miles higher up the river on its western shore is Point Henderson, and off it Duncan Island. There is a $2\frac{1}{2}$ fathoms patch, about half a mile inside the eastern sand-head which should be passed to the westward. Ships therefore may steer in between the entrance ledges of rocks on a W.N.W. course, until Point Henderson just touches, and is about to open with Deep Water Point bearing nearly N.W. $\frac{3}{4}$ N., which is the mark for clearing the patch; and when the centre of Joyce Island is brought to bear West, keep in mid-channel.

Port Foott.

Between Foott Point and the eastern sand-head, there is a very snug little anchorage and harbour in the northern monsoon; Capt. Owen has named it Port Foott.

Port Owen Johnes.

Round the north-eastern point of Boorgal is a deep bay, called by Capt. Owen Port Owen Johnes, and described by him as "a commodious harbour still in use by the coasting craft."

About 4 leagues N.E. of Durnford there is another river, between the entrance of which and Toola Island, there appears to be an anchorage, and 4 leagues further, the River of Shamba, fronted by the long narrow island of Thooala, which shelters the anchorage.

Tides.

The South Point (called by Capt. Owen Point Foott), of Boorgal Peninsula, is in lat. 1° 13′ S., lon. 41° 54′ E. High water at $4\frac{3}{4}$ hours on full and change, rise of tide 12 feet. Variation 10° 5′ W. in 1825.

Keeama and Kismayoo Islands.

KEEAMA, or CUAMA ISLAND, in lat. 0° 44′ S., may be known by two remarkable trees on it, seen at a considerable distance; and 4 or 5 miles more to the north-eastward lies Kismayoo Island, having on it three white patches, and within these islands and the others to the S.W. there is an inner passage for small vessels having various soundings, from 7 to 2 or $1\frac{1}{2}$ fathoms sandy bottom. Kismayoo Island has a village on the N.W. side, and near to its south point in lat. 0° 40′ S., there is a channel nearly a mile wide, with from 4 to 6 fathoms, leading to a spacious bay or harbour, where ships may anchor in 4 or 5 fathoms close to the S.W. part of that island, or inside the rocky islets that project from the north point of Keeama, and which bound the south side of the entrance. This anchorage, by Capt. Owen's

survey appears to be the best for large vessels of any of the inlets or harbours to the northward of Port Durnford.

DÆDALUS SHOAL, consisting of several rocky patches, about 4 leagues S.S.W. from Joob River, on which H. M. S. Dædalus struck, in standing out from the shore; she had from 16 to 10, 6, and 4 fathoms, then struck three times very hard, and by the swell running high, she was lifted over the rocks, plainly seen along-side, into 14 fathoms water. This danger is in lat. 0° 24′ S., lon. 42° 36′ E., by the survey, and 4 or 5 miles off shore, near some islands which form a bay within them; when the ship struck, the body of these islands bore W. ½ S., distant 4 or 5 miles. The coast hereabout is low, with sand-hills facing the sea in many places, and the surf runs high upon the shore, except where it is sheltered by islands or projecting headlands. Dædalus Shoal.

GOVIND or WOWVEENDA RIVER, called JOOB or JUBA, by the Arabs, also ROGUES RIVER, or RIO DOS FUEGOS, on the coast of Ajan; the entrance is situated in lat. 0° 14′ S., lon. 42° 39′ E.,* by Captain Owen's survey. Juba Town is composed of a few huts, situated on an eminence about a mile inside the river's entrance, which has a bar on which the surf beats high. It is high water at 4½ hours, on full and change of moon, and the tide rises 9 or 10 feet. Variation 8° W. in 1825. Boats may pass over the bar at high water during the fair season, but the perfidy of the natives should deter European ships from visiting this place. H. M. ships Leopard and Dædalus being very short of water, anchored here in December, 1798, expecting to procure a supply of this necessary article, or other refreshments; two boats upset in the surf, and although the natives at first appeared in a supplicating manner, they soon collected in numbers from behind the sand-hills, assaulted with their spears the boat's crew, and killed Lieut. Mears with several of the men. Excepting those that were killed, and two that were taken and made captives,† the remainder of the crews were chased by the savages along the beach 8 or 9 miles' distance to the southward, and taken up after sunset, in a small bay, by one of the boats that followed them along the beach. It was off the three islands which form this small bay that the Dædalus struck on the coral shoal, after having run down to pick up the boat containing the men who escaped the massacre. Govind River and Juba Town. Tides. The Natives hostile to Europeans.

In the latter part of November, December, January, and part of February, the currents set along this coast to the south-westward, frequently 2 miles an hour, and the wind prevailed generally fresh at E. S. E., veering two or three points at times. These ships continued to beat close to the coast during the time mentioned above, between lat. 1° N. and 1° S. Had they stood out into the open ocean, they would have got out of the strong current, which runs along the coast in soundings, and have been able to beat up to the Red Sea against the monsoon. Between Zanzibar and the equator, the current in March began to set to the north-eastward. Currents and winds.

That the above-named ships, under Admiral Blanket, would have effected their passage had they steered out from the land, may be reasonably inferred by the following brief notice of a passage in one of the king's ships.

* Captain Smee made it in lon. 1° 24′ West of Brava, by chronometer, or in lon. 42° 46′ E.

† When the Leopard and Dædalus were at Zanzibar procuring water and provisions, intelligence was received by the Arab coasting vessels, that there were two Europeans alive at Juba, and on the returning passage up the coast toward the Red Sea, the former ships anchored off Rogues River, and with great difficulty recovered these two men, after giving the savages arms, ammunition, and other things, to obtain their release.

H. M. S. Imogene, Captain H. Hart, sailed from Zanzibar February 7th, 1834, and with E. N. E. winds reached the equator on the 15th, close to the coast of Africa. From hence with northerly, N. E. and variable winds, she stood to the eastward on the south side of the equator till in lon. 58° E., where she crossed it on the 27th, and with N. E. winds steered to the northward, being within 50 leagues of Socotra on the 12th March. The winds continued between N. E. and North until she arrived at Bombay, March 29th.

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## COAST OF AFRICA, FROM THE EQUATOR TO RAS JAR D'AFOON WITH THE ISLAND OF SOCOTRA.

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Coast from Govind River to Brava.

FROM the entrance of Govind River, to the town of Brava, the coast extends nearly N. E. by E. the distance about 38 leagues. This part of it is usually rather low and sandy, with a high surf beating against the shore, but the soundings along it are more regular than on the coast of Zanzibar, and ships may approach it in many places within 2 or 3 miles of the shore.

Brava.

BRAVA, in lat. 1° 7′ N., lon. 44° 3′ E.,* by captain Owen's survey, is a town close to the sea, belonging to the Arabs, and seems well built; close to it lie several small islets or rocks, which break off the sea, and about a mile to the southward of the town on a small peninsula, there is a pagoda or tower, resembling a lighthouse. Inside the outer islets, called Barrette Rocks, the country boats lie sheltered in 3 to 2½ fathoms water: ships may anchor outside in 7 or 8 fathoms water, or in greater depth, but the road is exposed to a heavy swell, which rolls in with winds from seaward. Cattle and goats were seen to the southward of this place, and on other parts of the coast, but none were observed at Govind River, although they appeared in abundance 15 or 16 leagues to the southward of that place. The tide rises 8 feet, and it is high water on full and change at 4h. 30m.

Tides.

About 10 leagues to the S.W. of Brava, there are several high white sand patches near the shore. Variation 10° W. in 1824.

Coast from Brava to Mukdeesha.

From Brava, the coast extends nearly E. N. E. about 34 leagues to Mukdeesha. Between them, the coast is bold to approach, sterile, sandy, destitute of trees, with a few islands near it in some parts; but it abounds with cattle and goats, and has on it the towns of Torra, Mongooya, Marka, Jillip, Horealy, Denan, and Gezeerat, the latter is in lat. 1° 53′ N., lon. 45° 7′ E., and nearest to Mukdeesha.

Mukdeesha.

MUKDEESHA, or MAGADOXA, in lat. 2° 2′ N., lon. 45° 24′ E. by Captain Owen's survey, is the principal town on this part of the coast of Africa,

* Captain Smee, of the Ternate Bombay Cruizer, made it in lon. 44° 10′ E. by mean of lunar observations and chronometer.

easily known by three or four remarkable mosques or minarets, resembling towers, but which are tombs for the dead; there is also to the eastward of the town, a large copse of trees, but no river. A reef of coral rocks fronts the town, extending 3 or 4 miles to the eastward, within which is a narrow channel with 10 or 12 feet water at low spring tides, and having a sandy beach inside: no ground at the distance of 3 or 4 miles from the shore. Variation 9° W. in 1824. In 1700, the Albemarle anchored in 30 fathoms to the eastward of Mukdeesha, in sight of the town. She sent a boat on shore, which was seized by the natives, and they fired on the long-boat, whilst endeavouring to open a communication with them. The inhabitants of these towns, like those of Juba, may be considered hostile to Europeans.

Conduct of the Natives.

WARSHEK POINT is in lat. 2° 30′ N., lon. 46° 7′ E., N. E. of which a reef stretches full a league S.S.W. ½ W. from the rocky beach of the point next to the N.E. of Warshek, and to the S.W. the shore is skirted by rocky reefs for nearly 3 leagues. Upwards of 2 miles from the shore lies the dangerous shoal of Warshek, inside of which the Leven passed in 1825 without seeing it or having any indication of it until announced by the lead; but when clear of it breakers were seen, and it is supposed there must be less than 3 fathoms water on it, as the Leven passed over in 3½. Immediately to the westward of this shoal commences the WARSHEK REEF, which fronts the shore for 6 or 7 leagues at half a league off. The Leven coasted this reef from a quarter to half a mile outside, sounding with upwards of 40 fathoms. The shores inside the reefs are rocky.

Warshek Point.

Warshek Reef.

From Mukdeesha to Ras Asooad, or Aswad, the distance is about 71 leagues, and the general direction of the coast about N.E. by E., the variation being 7° W. in 1824.

Coast to the north-eastward.

To the northward of Mukdeesha about 4 leagues, a chain of hills extends from thence several leagues farther in that direction, and there is a bay, with white sand-hills, and a range of small islands, steep to, near the shore. Farther to the eastward there is another bay with white sand-hills, and a bank lines the shore along this part of the coast, having on it very irregular soundings. A ship in standing on the edge of this bank should tack immediately after getting soundings, for the depth decreases suddenly from 40 to 10, 5, and 3 fathoms coral, in some places. The whole of the coast is in general a sandy soil, rather low and sterile. The prevailing winds in March are from S.E. and E.S.E., the current then changes, and sets afterward to the E.N. Eastward.

Bank.

Winds and Currents.

TERNATE SHOAL, in lat. 3° 15′ N., projects about 2 or 3 miles from the shore, which the ship of this name nearly ran upon in 1811; she had soundings of 18 and 20 fathoms near it on the outside, and the sea breaking upon the shoal first pointed it out; this danger stretches out from a point of low land, otherwise destitute of any distinguishing marks.

Ternate Shoal.

Between Ternate Shoal and Ras Asooad, the coast is mostly low with soundings close to the shore; the entrance of the *doubtful* River Doara is supposed to be in about lat. 4° N., but no indication of a river appeared to Captain Smee in this situation, although cattle and natives were seen from the ship when sailing near the coast.

Doara River.

RAS ASOOAD, or ASWAD, or Black Point, in lat. 4° 30′ N., lon. 48° 1′ E., by the survey of Captain Owen, who describes it as a point of low black cliffs projected

Ras Asooad.

from sand-hills over the beach into the sea; it has low land near it to the southward, but the elevated land of Ul Hherab lies to the northward, which may be seen at the distance of 9 or 10 leagues. The Ternate had soundings of 20 and 30 fathoms in coasting along near the shore in this part.

Ras Awath.

RAS AWATH, in lat. 5° 33′ N., lon. 48° 40′ E., is about 24 leagues N.E. by N. from Ras Asooad, and fronted by a reef; the coast forms a small concavity between these headlands, with soundings of 20 to 40 fathoms, 2 or 3 leagues off shore. Some hills extend from Ras Awath a little way to the northward, and afterwards the coast becomes low with sand-hills in some places, and taking a direction about N.N.E., with soundings within a few miles' distance of 18 to 10 fathoms, and from 25 to 40 fathoms at 3 or 4 leagues' distance.

Ras-ul-Khyle.

RAS-UL-KHYLE, or MORO COBIR POINT, *i. e.* Serpent's Head, in lat. 7° 43½′ N., lon. 49° 45′ E., by the survey, is formed of three distinct cliff points, and is the south extreme of Negro Bay. The land to the southward is moderately high, but the coast of Hazine* to the northward of Ras-ul-Khyle, is low and rocky to a great extent. From Ras Asooad to this place, the land is generally sterile, of an even appearance when seen at a considerable distance, but is little frequented by Europeans. Captain Owen describes the Leven, in hauling off shore for the night, to have struck soundings on a 6 fathom knoll when the northern point of Ras-ul-Khyle bore S.W. by W. ½ W. about 6 miles. The water shoaled from 19 to 6½ fathoms, then deepening regularly to 26 fathoms on the edge of the bank 8 miles E. ½ S. from off the northern point of Ras-ul-Khyle. Circumstances did not admit of a close examination of the soundings near this point, but he thinks it merits further attention, although the pilot was not aware of any danger on this part of the coast. Variation 6° W. near Ras-ul-Khyle, in 1824.

Ras Mabber.

RAS MABBER, or CAPE STAND-OFF, in lat. 9° 29′ N., lon. 50° 50′ E., by Capt. Owen's survey, is fronted by a reef, and the contiguous land is usually rather low. The name of the cape indicates the customary practice of the Arab coasters, bound to the northward, who always run out from this point with the southerly monsoon, in order to round Ras Hafoon, and avoid the dangerous intervening deep bay, a needful precaution, as will soon be perceived. According to Captain Owen, Ras Mabber has good anchorage in 6 fathoms on its northern side, the coasters frequently stopping there for water. About 8 leagues to the southward, there is a projecting point of land, between which and the former a concavity is formed, which should not be entered, being imperfectly known: soundings do not extend far from the shore.

Ras Hafoon, or Cape Orfui.

RAS HAFOON, or CAPE ORFUI (eastern extreme), in lat. 10° 28′ N., lon. 51° 22′ E., by Captain Owen's survey, or 4 miles East of Ras Jar d'Afoon, is a peninsula 300 feet above the sea, joined to the main land by a low and narrow sandy isthmus which extends 3 leagues East and West, forming a deep bay, with good anchorage on either side according to the season. During the northern monsoon,

Supplies.

the Arab coasters lie in the southern bay, where wood, water, and refreshments may be procured. The peninsula is also said to abound with cattle, sheep, camels, and

* Hazine is the name given to this coast by the Arabs, signifying "Rough Ground," which descriptive term has been corrupted by Europeans into Ajan, Azon, and Azamea. Southward of Ras-ul-Khyle is Sef-Tweel, "The Bald," or "declining shore," and after that Herab, or "Mountainous country."

horses. It is under the dominion of a Somauli, who resides a few leagues in shore of Cape Delgado. To the south-westward of this cape, there is a part of the land high and flat like a barn, which appears at a distance separated from the Cape land, the space between them being low; and the flat land called Barn Hill, is in lat. 10° 17′ N.* Several ships bound to the Red Sea, with provisions and necessaries, and some with water for the troops employed on the expedition to Egypt, got into the bay to the southward of Ras Hafoon, in 1800 and 1801. One of these, a ship belonging to Bengal, got into this bay in the night, and was lost; the commander, Captain Baird, and the crew, were supposed to have perished. The Jehanghire, and other ships from Bombay, also got into this bay in the night, when steering to make the land about Ras Hafoon, and with great difficulty got clear of it, by carrying a press of sail. The Mornington, June 21st, 1801, at sunset had the land bearing from S.W. by W. to N. by W., distant 7 or 8 leagues; steering N. by E. and N. by E. ½ E., at 11 P.M., shoaled the water, and hauled out E. by S.; at 1 A.M., the land was seen a-head E. by S., wore and stood W.S.W. 6 miles, then tacked and lay up E.S.E. with the wind at South. When day-light appeared, found we had entered a deep bay, the eastern extremity of it, Ras Hafoon, bearing E.N.E.

Barn Hill Bay, S.W. of Cape Orfui.

Ships embayed in the night.

These examples are sufficient to evince the propriety of ships steering for this part of the coast being cautious in thick weather, or during the night.

In rounding Ras Hafoon, the three projecting headlands of which it is formed may be perceived, stretching nearly North and South, about 2½ leagues; the middle of these stretches farthest out, and is the easternmost point of Africa. The land about the cape is even, without any mark, excepting the low space between it and Barn Hill. The soundings about 3 miles off, are 40 fathoms; variation 4° 4′ West in 1824.

Variation.

In lat. 10° 34′ N. is situated Hor Hardea, an inlet on the north side of the isthmus of Ras Hafoon. The pilot of the Leven stated this port to have 7 fathoms in its entrance, and 12 fathoms within it, with deep water close to its shores; also that the inlet extends several miles inland and is very spacious: he had himself never been in it, but described its position as it is placed on the Chart. "There is reason to believe, however," adds Captain Owen, "that it may be 2 or 3 leagues nearer to Ras Banna, although we fancied that we saw the beach clearly every where as delineated on the chart, yet it is possible that a narrow entrance may have escaped observation at the distance we were off shore. The man who was then our interpreter, says now (in 1834) that he has since been in this port, and he confirms this description of it."

Hor Hardea.

RAS JAR D'AFOON† or CAPE GUARDAFUI, the north-easternmost promontory of Africa, is about 30 leagues North of Ras Hafoon; the coast between them forming two large bays, which are separated nearly mid-way by the bluff headland of Ras Banna, in lat. 11° 12′ N. There are soundings of from 40 to 60 fathoms within 2 leagues of the shore, between Capes Hafoon and Jar d'Afoon.

Ras Jar d'Afoon, or Cape Guardafui.

Ras Banna.

The land around Ras Jar d'Afoon is higher than the other headlands on the East coast of Africa, and to the southward of the cape there is a high mountain that may

* Lat. by Captain Owen 10° 15′ N. Summit 800 feet high.

† Captain Owen has given this name to the projecting part of the land that is in lat. 11° 41½′ N. and 7½ miles to the southward of Ras Jar d'Afoon; and to the latter he has given the name of Ras Asser, but it may be preferable to continue the name of Jar d'Afoon, or Guardafui, to the north-eastern extremity of Africa, as hitherto marked by geographers.

be seen a great distance. Between them the land is craggy at the top, with some low, even land underneath, which appears separated from it, and forms like double land. From hence the declivity towards the cape forms several notches, at regular distances, which appear like steps, and make the cape easily known. The shores around it are bold; the Blenheim, in 1710, had 15 fathoms fine white sand with the outer point of Ras Jar d'Afoon bearing South, distant 4 miles; and the Susannah got close to the cape, into 10 fathoms, in the night. Variation near the cape 4° 6′ W. in 1824.

Position of Ras Jar d'Afoon.

This cape is in lat. 11° 50′ N., lon. 51° 29′ E., by mean of many lunar observations and chronometers: several persons have made it 21° 25½′ West of Bombay, by chronometers, but Captain Smee, in 1811, made it 21° 29′ W. from Bombay, which would place it 3½ miles more to the West, or in lon. 51° 25½′ E. Captain Owen's survey of this coast places the extremity of the cape in lat. 11° 49′ N., lon. 51° 18′ E., or 8 or 10 miles more West than its position by other authorities; and the whole of the longitudes given by this officer are farther to the westward than those previously laid down.

Socotra.

SOCOTRA, or SOKTRA ISLAND, extends nearly East and West 71 miles, and its greatest breadth is 22 miles, according to the excellent survey, in 1834, by Captain Haines and Lieutenant Wellsted, of the Indian Navy, from which the following description and directions have been chiefly furnished. It is generally composed of high mountainous land and granite peaks, and excepting a few of the headlands that have projecting reefs, the shores of the island are bold to approach, with soundings at a considerable distance in some places. There are several anchoring places, which may be used according to the prevailing monsoon; but those affording shelter during the easterly monsoon, on the S.W. side of the island, having few inhabitants, refreshments, or good water, are not convenient for ships.

Tamareed, or Hadeboo Bay.

Tamareed, or Hadeboo Bay, on the north side of the island, where the chief resides, also called by the Arabs Bunder Beeland, or the Town Anchorage, is 10 leagues distant from Ras R'dresser, the East Cape; it is the most eligible place for getting refreshments, Tamareed being the principal town, but the anchorage is indifferent.* This place is known by a point of sand, that forms the eastern anchorage, about 1 or 1½ miles off shore, in 10 to 13 fathoms sand and coral, with the town South or S. by W. On the north coast, in coming from the eastward towards Tamareed Bay, two white sand-hills may be perceived, the westernmost of which is much the larger, and about 4 miles to the westward of it is the town, over which are high craggy granite peaks, resembling chimnies, visible 7 leagues off. When the bay is approached in the S.W. monsoon, the coast should be kept a-board from the east end of the island, as the wind blows in gusts off the high land. No ground is got with 100 fathoms line within 3 or 4 miles of the coast from the east point of the island to Ras Howlaf, which is about 5 miles to the E. N. E. of Tamareed, but to the westward of that headland, and fronting the bay, the bank extends farther off shore, with gradual soundings from 5 to 20 fathoms, the town bearing south-westerly, with high land over it, in notches like chimnies.

Supplies.

Bullocks, goats, sheep, and fish may be procured here at reasonable prices, and good water, which runs from the mountains into a sandy valley

* On the 9th of October, 1701, the Discovery, Indiaman, anchored in 6 fathoms sandy bottom, with the town of Tamareed bearing S.S.W. distant 1 mile, the easternmost point E. by N. ½ N. 3 leagues, and the western part of the island in sight W.N.W. distant 8 leagues. Variation about ¾ of a point westerly at that time.

among date trees, about a quarter of a mile from the town. Captain Tait, of H.M.S. Grampus, made the anchorage in lat. 12° 39′ N. Captain Haines' survey makes the town in lat. 12° 39′ N., lon. 54° 6½′ E., or 18° 49′ West of Bombay.

The natives are poor, and have been usually hospitable to strangers: rice is an essential article to barter with them for refreshments. Good aloes may be procured, and at times, dragon's blood in small quantities, grapes, water-melons, pumpkins, oranges, and plantains may be got in March and April, and plenty of dates in June. Captain Owen touched at Socotra, in H.M.S. Leven, during his survey of the eastern coast of Africa, and gives the geographical position of the following places, which differ considerably from the longitudes by the survey of Capt. Haines, of the Indian Navy. Natives.

Captain Owen places Ras Shaaeb, called also Ras Rarby, the west point in lat. 12° 30′ N., lon. 53° 8½′ E. The east point in lat. 12° 31¼′ N., lon. 54° 32¼′ E. Tamareed Town in lat. 12° 36¾′ N., lon. 53° 46′ E. Pyramid Rock in lat. 12° 44¾′ N., lon. 53° 27′ E., and the N. E. point of Gollonsier Road in lat. 12° 43′ N., lon. 53° 23¼′ E. Positions by Capt. Owen.

Ras Kourma, in lat. 12° 38′ N., lon. 53° 56′ E., by the survey of Captain Haines. The eastern low point of Kourma Bay is about 3 leagues to the westward of Tamareed, and may be known by a few rising sand-hills near it: a reef projects off it, about 300 yards, and along the shore to Ras Tahal, about two miles to the eastward. The small bay and village of Kathoob are about 3½ miles to the eastward of Ras Kourma; which bay is more sheltered from the westerly monsoon than that of Tamareed. Ras Kourma. Kathoob Bay.

Ras Kadarmar, in lat. 12° 42′ N., lon. 53° 43′ E., bearing W. N.W. ¼ W. from Ras Kourma, distant 4½ leagues, terminates in a low point from a bluff close to it, and forms the western boundary of Gubet Kourma, a large bay, which affords tolerable shelter in 5 or 6 fathoms sand and shells, by anchoring in its eastern part under Ras Kourma, with the point bearing N. E. by E., about half a mile off shore; but the west side of the bay is a lee shore in the easterly monsoon; the bottom is mostly sandy and rocky, but the depths decrease gradually to the low coast surrounding the bay; about 5 or 6 miles inland the country becomes mountainous. Ras Kadarmar.

Ras Bashuree, distant 4½ miles W. by N. from Ras Kadarmar, and the coast for 2 miles farther west to Ras Summaree, is the most northerly part of Socotra, where the mountains are nearly 2,000 feet high, and almost perpendicular from the coast line in some places, with a rocky beach along the shore. A pyramidal rock nearly 150 feet high, is joined to Ras Bashuree by a narrow neck of land about 50 yards in length: from which rock soundings begin to extend again, a considerable way out from the coast to the westward; but from Ras Kadarmar to Ras Bashuree, although there are soundings near the shore, none are found at 3 or 4 miles' distance. Ras Bashuree.

Ras Gollonsier, about 4 miles to the westward of Ras Bashuree, and forming the eastern point of Gollonsier Bay, may be known by four small granite peaks on it, and by the hills near them being in some places covered with sand. Between Ras Gollonsier, and Ras Summaree, the coast is fronted by a shoal extending midway between the capes a mile off shore, dry at low water in some parts, with patches of 2 fathoms near its edge, to which the soundings gradually decrease. Ras Gollonsier.

Gollonsier Bay, which affords anchorage in the N. E. monsoon, is formed by the bluff cape Ras Bedoo to the westward, and Ras Gollonsier to the eastward. It is the anchorage used by the Arabs, and it possesses many advantages over that called Watering Bay by Europeans. The town or village of Gollonsier, about a mile to the southward of the cape, is small, not containing 200 inhabitants, but Captain Haines procured a plentiful supply of wood and water, sheep and goats; a few fowls, beans, Gollonsier Bay.

and pumpkins were also obtained, but no bullocks. The Mosque is in lat. 12° 41½′ N., lon. 53° 34¼′ E. The best anchorage is in 4 fathoms low water, with the northern granite peak on Ras Gollonsier N. E. by E. ½ E., the Mosque S. E. by E. off the sandy beach or best landing place 800 yards. Tides. High water at 7 hours 20 minutes on full and change of moon. Rise and fall of tide 8 feet, and the flood sets to the eastward. This bay affords no shelter from the westerly monsoon.

Ras Bedoo. Ras Bedoo, in lat. 12° 39′ N., lon. 53° 28¾′ E., terminating in a bluff about 300 feet high from the Gibbal Maallee mountains, forms the north-eastern boundary of Gubet Shaaeb, a fine bay, having regular soundings all over it, without any danger a quarter of a mile from the shore. To the northward of Ras Bedoo, no soundings were got at the distance of a mile, but to the westward of it, soundings of 20 to 34 fathoms extend several miles, rocky bottom, and good fishing ground.

Shaaeb Bay. Shaaeb Bay is 4 or 4½ miles in extent, between Ras Bedoo and Ras Shaaeb, affording good shelter from the N.E. monsoon, but completely exposed to the S.W. Although the water in this bay is smooth in the N. E. monsoon, strong gusts of wind at the phases of the moon sometimes blow from the high land, raising the water as a whirlwind from the surface of the sea, requiring great caution when under sail. The best anchorage is in 10 fathoms with the points of the bay N. ½ E., and S.W. by W. ½ W., off some mangrove trees, close to which is a lagoon of salt water, rising and falling with the tide at the beach of the sea, although they are separated by a bank of sand 400 yards in breadth. The lagoon is in lat. 12° 35′ N., lon. 53° 28′ E., and a mile to the north-eastward of the small village Marthiun Gibboose, where some good water is obtained from wells; the village consists of a few huts only, and the whole population of the bay probably may be about 150 persons, who live in caverns, or natural excavations.

Hills. About 2¾ miles eastward of Ras Shaaeb are two remarkable hills, like ears, 1,488 feet high from the surface of the sea, which are visible from the S.W. side of the island; these bearing S.W. by S., are the best mark for the anchorage, and Ras Shaaeb W.S.W. in 10 fathoms, about three quarters of a mile off shore, in a soft white sandy bottom, where the water is smooth during the north-easterly monsoon.

Ras Shaaeb. Ras Shaaeb, the western cape of Socotra, in lat. 12° 33′ N., lon. 53° 23′ E., is the termination of the sloping side of a high mountain; a reef extends from the cape about 300 yards. The coast from hence extends nearly S. E. by E. 11 miles in a direct line with a sandy beach, terminating at a sand-hill; and at this part forming a bay, from which to Ras Kattannie the coast is rocky and precipitous, having 4, 5, and 6 fathoms water a few yards from it. The soundings along this part of the coast are usually sand and rocks, without danger, but about a mile from it, a 6½ fathoms bank extends parallel to the shore, for the greater part of this distance; which bank is not above half a mile in breadth, having 8 and 9 fathoms inside of it, and the same depths outside, with regular soundings to 20 and 25 fathoms water, about 5 or 6 miles off shore. Tides. The ebb tide along this side of the island runs S.E. 1 mile per hour; rise and fall 7 feet on the springs; high water at 7 hours on full and change of moon, very irregular.

This part of the coast affords shelter from N. E. and North winds, and there is anchorage inside the narrow bank mentioned, in a little bay at the sand-hill, called Bunder Nea. Gubet Nea, or Bunder Nea, with 3 and 4 fathoms water very close to the shore, at the northern end of the rocky cliffs, where there is a small village.

Ras Kattannie. Ras Kattannie, in lat. 12° 22½′ N., lon. 53° 37′ E., is a beautiful perpendicular headland, elevated 1,455 feet above the sea, and has the same aspect when viewed either from eastward or westward. A chain of mountains called Gibbul Kueirah, nearly of

equal height, extends from it 5 miles to the eastward, and the same chain continues nearly to the east end of the island, excepting a few passes through the chain, by which the inhabitants go to Tamareed. This chain in most parts rises like a perpendicular wall from the low land, intercepted between its base and the sea, which belt is from two to four miles broad, and called Nowkad by the natives. This low land affords good pasturage for their numerous sheep and goats; but the people were found to be very timid, always retreating with part of their flocks to the mountains, when Captain Haines, or his officers, wished to communicate with them: but having a native of the island on board, a conference was effected, and a good supply of sheep and milk was obtained from these harmless, and apparently honest people. Coast to the eastward. Natives.

The whole coast between Ras Kattannie and Ras Fellingk is bold to approach, with soundings of 12 to 20 fathoms, extending from 4 to 12 miles off, and decreasing regularly towards the shore, although in some places there are overfalls of 2 and 3 fathoms. On this side of the island, several reservoirs receive the drainage from the mountains, the water obtained by digging wells being brackish. One of these reservoirs, called Waddee Fellingk by the natives, is supplied by a fine stream of fresh water running through the low land, the reservoir or basin being separated from the sea by a bank of shingle: this reservoir is 3 leagues to the westward of Ras Fellingk, at the place where the sandy beach terminates in rocky cliffs facing the sea, and extending eastward along the Fellingk shore. Here, during the fair season, a ship might easily procure a supply of fresh water, by anchoring in 7 fathoms; also sheep, if caution is taken to communicate with a few of the inhabitants; otherwise they will retreat to the hills. Coast between Capes Kattannie and Fellingk. Reservoirs.

Ras Fellingk, about 18 leagues to the eastward of Ras Kattannie, and about 6 miles S.W. by W. $\frac{1}{2}$ W. of Ras R'dresser, forms in a bluff cape, when viewed from the westward; but on a near approach, a low point is perceived to project from it nearly a mile, between which and Ras R'dresser the coast forms a bay, with regular soundings, decreasing gradually to the shore. Ras Fellingk.

Bunder R'dresser is an anchorage formed to the south-westward of Ras R'dresser, where a vessel might anchor in 9 fathoms sand and rocks, in tolerably smooth water, during the N.E. monsoon, with the outer small patch of rocks on the detached reefs off R'dresser, bearing E. $\frac{3}{4}$ S., the low point N.E. $\frac{1}{4}$ E., and the high bluff of Momee W. $\frac{1}{4}$ N. The channel formed between the detached reef and that projecting from the point, has depths of 7 to 9 fathoms, but being less than half a mile wide, with rapid currents or tides causing strong ripplings, it would be imprudent to pass through it, except with a strong leading wind in a case of emergency, particularly as there is no ground at 90 fathoms to the north-eastward of this intricate channel at the distance of half a mile from the shore of R'dresser. Bunder R'dresser.

Ras R'dresser, in lat. 12° 34′ N., lon. 54° 35′ E., is the extremity or low eastern cape of Socotra, forming in two small rocky points, which are nearly a mile distant, bearing North and South of each other. A reef projects a quarter of a mile from both, and at the distance of $1\frac{3}{4}$ miles to the eastward and northward you have 120 fathoms water, so as to prevent the lead from being a safe guide, in approaching this extremity of the island from the eastward, north-eastward, and northward. About a mile S.E. of the cape is a detached shoal, some of the rocks of which are above water, and between which and the shore reefs there is a channel, with from 6 to 9 fathoms water. In the same direction, at 8 miles' distance, there are 54 fathoms water, gradually decreasing to 30 and 26 fathoms, about a mile off the rocks. Ras R'dresser.

Ras Momee (Socotrean), or Ras Mutlar (Arabic), Cape East, in lat. 12° 34′ N., Ras Momee.

lon. 54° 31½′ E., is a remarkable bluff mountain, 1,920 feet high, sometimes, from its form, called the Dolphin's Nose. It is the termination of the high chain that extends the whole length of the island, and is seen in clear weather at a considerable distance, when the low extreme of Ras R'dresser, about 4 miles farther East, is not visible.

Bunder Fekah. Bunder Fekah, about 2 miles to the westward of the north point of Ras R'dresser, is a bay formed on the west side of a small sandy point, from which point a reef projects half a mile. This place forms a small anchorage, protected by the reef from easterly winds, where the small vessels from Cutch, or other places, stop to procure water in April and May on their pilgrimage to Juddah. Water is got from a well near the village, or from a spring which issues between the two eastern sand-hills. The best anchorage is with Momee Bluff S. 58° W., the outer break of the reef N. 42° E., Ras Dome N. 74° W. in about 12 fathoms. In approaching this anchorage, caution is requisite, for the sea does not shew the reef by breaking upon it, unless with a strong wind or heavy swell, and close to it there are 5 fathoms water, but 400 yards off no bottom at 60 fathoms. The village is small, the number of inhabitants probably amounting only to about 50 or 60, who are poor, timid, and inoffensive, some of them living in huts, or in excavations.

Ras Dome. Ras Dome,* bearing W.N.W. ½ W., about 8 miles from the eastern point of Bunder Fekah Bay, is a sharp projecting cape, about 250 feet high, forming only a small concavity of the coast line; to the eastward of which scarcely a shrub is seen, except at the sand-hills mentioned as a watering place, where there are a few trees; but to the westward of Ras Dome, both the hills and valleys appear verdant, interspersed with small villages which are inhabited by 20 or 30 poor people, who live on their flocks and fish, and supply good sheep or bullocks at a fair price.

Ras Hammedara. Ras Hammedara bears W. by N. ½ N. distant 6 miles from Ras Dome, between which are the three date groves of Thouerah, Cloyef, and Tamerah, with a fine fresh water pool near Cloyef. The coast in this space is safe to approach, the bank of soundings projecting only from ½ to ¾ of a mile from it: but N.E. from the low point of Ras Hammedara, distant half a mile off shore, there is a rocky shoal nearly dry; with a narrow channel of 5 to 7 fathoms between it and the shore reef that projects 300 yards from the point.

Khore Gurreah. Khore Gurreah, a small creek between Ras Hammedara and Ras Dehammerie, is salt at the entrance, where it will not admit a boat, being nearly filled up: but inland, it unites with a fresh water stream, having its source several miles in the interior, with numerous date trees growing on its banks.

Bunder Gurreah. Bunder Gurreah, a small bay formed by the projection of Ras Dehammerie, where a vessel might anchor in 6 to 10 fathoms water, sand and rocks, from ¼ to ½ a mile off shore, with the extreme point of the cape bearing N.W. by N., or N.N.W., where she would be well sheltered from the S.W. monsoon.

Ras Dehammerie. Ras Dehammerie, a narrow low projecting headland, ¼ to ⅓ of a mile in breadth, bearing from the extreme eastern point of Ras Howlaf, E.S.E. ½ E., distant 11,434 yards, has on it two remarkable hillocks, by which it may easily be known, the northernmost about 130 feet high. On each side of this cape there is a small anchoring place, that on the eastern side called Bunder Gurreah, already mentioned; and the western one, called Bunder Debenee. No soundings with 280 fathoms line were got at the distance of ¾ of a mile North from Ras Dehammerie, nor is any obtained until

Bunder Debenee.

* This name is applied on the chart to a point nearly 2 miles farther East than the one here described.

within a few hundred yards of it. Close to the extreme point there is a rock, and a rocky spit of 2½ fathoms projects from a small rocky point to the S.W. of the former. A vessel might anchor to the S.W. of the same spit in 3 or 3¼ fathoms, close in shore, with the point bearing E. N. E., but the bottom is coral rock, and the anchorage of Bunder Debenee seems not calculated for large vessels.

Bunder Deleeshe, or Deleeche Bay, is formed between Ras Dehammerie and a small point near Ras Howlaf, on which point there are the ruins of a little mosque or tomb: across this bay soundings extend a considerable distance from the shore, which is safe to approach, and it affords the best shelter of any of the anchorages on the coast of Socotra during the S.W. monsoon. In the centre of the coast line there is a sand-hill, with a creek half a mile to the westward, called Khore Deleeshe, salt and shoal at the entrance, and like Gurreah, united to a fine fresh water stream inland, with date trees on its banks. The sand-hill bearing S. or S. by E. is a good mark for the best anchorage in 7, 8, or 9 fathoms water, from a quarter to half a mile off shore. Bunder Deleeshe. Khore Deleeshe.

Ras Howlaf, before mentioned in describing Tamareed Bay, is nearly 3 miles N.W. by W. of the ruined mosque already mentioned, and bears from the mosque of Tamareed, N. E. by E. ½ E., distant nearly 5 miles. It consists of a low projecting cape, rising gradually towards the interior, and forming undulating sand hillocks, covered with a prickly bush: fronting the sea, it has small rocky points, with intervening sand beaches. The anchorage on the western side of Ras Howlaf is rather preferable to that of Tamareed Bay, yet with the wind at E. N. E., a considerable swell rolled in, but not so much as abreast of the town, where there was a breaking sea at the same time: neither was landing so difficult as in other parts of Tamareed Bay. Ras Howlaf.

The places affording shelter for ships are thus described by Captain Haines:—

"Socotra has no points where a vessel could ride safely in all winds; and it is only on opposite sides of the island that good shelter is found from the prevailing monsoon. There are, however, several bays and anchorages, sheltered from East and E. N. E. winds; of which are Gubet Kourma, Gollonsier, Shaaeb, Bunder Nea, Bunder R'dresser; also Bunder Fekah, and Tamareed, with the wind at East, if well in. For N. E. winds all these mentioned are tolerable, excluding Tamareed; also, if close to the southern shores of the island, the anchorage may be tolerable in N. E. winds." Places of shelter.

"During the S.W. monsoon, a vessel may find shelter from the sea in all the bays on the north side of the island, between Ras Kadarmar and its eastern extremity; these are Kourma, Kathoob, Tamareed, Deleshe, Gureah, and Fekah; but, as the wind blows in violent gusts from the mountains, good ground tackling is necessary, the anchorage being usually on a narrow bank of sand or rocky bottom, which has a steep declivity to the northward out of soundings. Of all these anchorages, Bunder Deleeshe is the only one which the natives call perfectly safe during the S.W. monsoon, and where there is very smooth water."

"The winds considered most dangerous along the north side of the island, by the natives, are expected between the beginning of November and January, when, at the setting in of the N. E. monsoon, the squalls blow violently several days from N. N. E. with rain, and a high sea, rendering it almost impossible for anchors to hold. Captain Haines experienced one of these northerly gales so late as the 23rd February, 1834, while surveying on the south coast of the island." Winds and weather.

"From February to May is the fine weather season, when the anchorages on the northern coast are considered safe."

"In June, July, and August, the natives say, the wind blows constantly in violent gusts from the hills on the north coast; while at the low belt of Nowkad on the south

coast, the wind is more steady and less violent, with, however, a tremendous sea and surf."

"In these months rain falls in showers, but much less than the quantity that descends with the squalls of November, December, and January."

"In September, October, and part of November, light land and sea breezes are experienced; and late in November the wind becomes gradually more settled from the northward."*

Tides.

"The tides are very irregular, sometimes running 16 hours in one direction, and at other times only 6 hours, depending much on the strength of the winds. The flood sets to the westward on the south coast, and to the eastward on the north coast; and the ebb in opposite directions. The times of high water vary between 7 hours 20 minutes, and 8 hours 40 minutes in different parts. The rise and fall from 6 to 8 feet. Currents around the island are chiefly dependent on the winds. Between the Arabian coast and Socotra, a W.S.W. current, of 40 miles per day, was experienced in January; and in March an easterly one of about 30 miles."

Currents.

Abdul Koory.

ABDUL KOORY, or ABD-UL-CURIA, ISLAND, mid-way between the west end of Socotra and Ras Jar d'Afoon, is a high rugged island, about 6 leagues in extent East and West, but narrow, with two hills near the centre, giving it the appearance of separate islands when seen at a great distance. It is inhabited by people miserably poor, having little food and indifferent water. The Ternate saw a bay or concavity on the west side of the island, but no soundings were obtained by this ship within 3 miles of the southern coast, in passing along. Captain Owen, nevertheless, has laid down soundings of 19 to 58 fathoms along this side of the island; and he anchored in H. M. S. Leven, in a fine bay, formed by a narrow isthmus of sand-hills, with a coral bottom, which bay is directly at the western point of the high mountain on the south side; but this place affords no refreshments for ships, although above 60 persons contrived to exist upon its barren soil. He places the west point in lat. 12° 12½′ N., lon. 52° 8′ E., and the N. E. point in lat. 12° 11½′ N., lon. 52° 23′ E. Other navigators make it farther to the eastward. High water here at 4½ hours; rise of tide 8 feet on full and change of moon.

Tides.

Salt's White Rocks.

SALT'S WHITE ROCKS have probably often been seen and mistaken for the large island described above, although the real existence of this rocky islet was not known to navigators till Mr. Salt, returning from his embassy to Abyssinia, in the Marian, saw it at 11 A.M., 7th July, 1810, about 4 miles distant, when passing between it and Abdul Koory; it then appeared to be a high white rock, about 5 or 6 leagues to the northward of the island, in about lat. 12° 27′ N., by Mr. Salt's description. Captain Owen's survey makes it in lat. 12° 23′ N., lon. 52° 9′ E., or 6 leagues N.W. from the eastern point of Abd-ul-Curia.

Captain J. Parkin of H. M. S. Bacchus, 15th of April, 1817, near 2 P.M. passed between the island of Abdul Koory, and the westernmost Brother, and in rounding the N. E. end of the former about 2 miles' distance, crossed over a shoal, having on it from 27 to 10 fathoms water: a strong current was then setting from the westward, and the wind being easterly, the sea broke into the gun-ports, although the weather was moderate.

After passing the N. E. end of Abdul-Koory at 2 P.M. steered by compass N.W.

* This description of the winds is chiefly from the report of the natives.

by W. 23 miles, then saw High White Peaked Rocks bearing N.E. ½ E., distant 6 miles; they were perfectly white, forming in five peaks, with a black rock fronting the sea when viewed in the bearing mentioned above, and may be discerned 7 or 8 leagues.

THE BROTHERS, are two barren islands, the westernmost called Sumhah, in lat. 12° 6′ N., being 6 miles in length; and they are situated nearly W.N.W. and E.S.E. from each other, distant 8 miles, and 7 or 8 leagues from the western part of Socotra. The eastern one called Derzee or Duraja by the Arabs, is smallest, and bears North when on a transit line with the western end of Socotra. Soundings extend from the S.W. part of Socotra nearly to Derzee, and also to the southward and south-westward of them; but at a small distance from Sumhah to the northward and westward there are no soundings at 140 fathoms. The Brothers.

The Surat Castle, in 1805, was said to have got into 6 fathoms coral rocks in attempting to pass between the Brothers, with strong ripplings and a turbulent swell, produced by the current, which made it prudent to relinquish the attempt. But Capt. Haines in exploring the channel, found from 18 to 20 fathoms regular soundings, sand and rocky bottom, without any appearance of shoal water near, or in the passage between the islands, which is 7 miles wide. Passage between them.

SABOYNA ROCKS, bear N.W. by W., 10 miles distant from Ras Shaaeb, the west end, and 13½ miles W. ¼ S. from Ras Bedoo, the N.W. point of Socotra. They resemble two ships under sail, when seen at 8 leagues' distance, being white, and of considerable height. Saboyna Rocks.

By Captain Owen's survey, they are in lat. 12° 40′ N., lon. 53° 2′ E. The channel between them and Socotra is safe, with no soundings except near Socotra, or close to the Saboynas, which have 18 to 26 fathoms water very close to them, and to the distance of a mile from them.

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## COAST OF AFRICA, FROM RAS JAR D'AFOON TO THE STRAITS OF BAB-EL-MANDEB.

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FROM RAS JAR D'AFOON, or CAPE GUARDAFUI, the coast extends 8½ or 9 leagues W.N.W. to Ras Met, in lat 11° 55′ N. by Captain Owen's survey; the land fronting the sea, high and steep from the former cape, then it is a low barren plain, for 4 or 5 leagues to Cape Felix, but inland the country is mountainous. Between these capes, soundings are usually got within 2, 3, and 4 miles of the shore. From Ras Jar d'Afoon, towards the Red Sea.

Admiral Beaulieu, in August, 1619, anchored in six fathoms rocky ground, about four leagues West of Ras Jar d'Afoon, opposite to some green shrubs, very uncommon on the coast. Water was found by digging one or two feet deep, at first sweet, but Water procured.

after filling a short time, it became very salt, obliging them to dig in more than seventy different places, to obtain 22 tons of water, which, with 30 men sent on shore for the purpose, was done in 4 hours, the soil being sand. They had before anchored in 9 fathoms a little to the westward of Ras Jar d'Afoon.

There are three headlands between this cape and Cape Felix, and a little to the east of the 2nd point or headland, the Arabia Merchant's boat landed 2nd June, 1705, where they found straggling huts in three places, forming small villages, the inhabitants of which were friendly,* and bartered some fish, their chief food, for tobacco, beads, knives, &c. and they shewed a watering-place to the boat's crew.

Natives.

On the following day the boat landed, with suitable articles to purchase what could be got, farther westward; she returned with 8 sheep and lambs, all with black heads, having also in a former voyage procured sheep here with the same marks.

Ras Met.

RAS MET, or LOW POINT, situated about 5 leagues to the eastward of Cape Felix, projects considerably, forming a deep bay on each side, with a shoal spit extending from the point, which ought to have a berth in passing. The Marian, at midnight 29th September, 1809, had 10 fathoms water on this shoal, Mount Felix bearing W. by S. ½ S., distant about 5 leagues.

On the 3rd of June, 1705, the Arabia Merchant, steering for this low point about W. N.W. running along shore in 8 fathoms water, discerned the white sandy ground under the bottom when to the eastward of the point. In the bay between Low Point and Cape Felix, regular soundings extend 4 or 5 miles off shore, with anchorage in 8 fathoms sand about a mile from it; the surrounding coast is low near the sea.

Current.

Dr. Vincent, in his observations on this part of the coast, noticed by Mr. Salt in his voyage to Abyssinia, states, that the current runs out of this gulph during the wane of the moon, and into it during her increase, which seems to agree with the remarks of some navigators. But after the 1st of August, the current sets generally strong along the coast to the westward nearly to Zeyla Bay, often at the rate of 2½ miles or 3 miles an hour near the shore.

Ras Feluk, or Cape Felix.

RAS FELUK,† or CAPE FELIX, in about lat. 21° 0′ N., lon. 50° 46′ E., or 42 miles west of Ras Jar d'Afoon by chronometer, is a high steep cliff of regular shape, projecting far into the sea, and the circumjacent land being low, gives it the appearance of an island, whether viewed from the eastward or westward; it may be seen at 15 leagues' distance in clear weather, and there is very deep water within a quarter of a mile of it on the outside.

Probably an Island.

It will be seen from the following remarks, taken from original journals, that Mount Felix is *probably* insulated by an arm of the sea.

Captain Saris, in 1612, states, that on the west side of Cape Felix, there is a

* Above a century back, it appears by the journals of the Company's ships, that the native Somaulees of this coast, were of the negro cast, as they are at present; but at that time, they frequently came off in their canoes to ships passing along the coast, with fish, fishing lines, and sometimes a few goats, or fowls. From what little we know of them at present, they are less friendly, and not to be trusted; the crew of a ship, which was recently wrecked in the deep bay on the south side of Cape Orfui, mostly all perished by hunger, or by the inhumanity of the natives, in attempting to pass through this desert country toward Zeyla. And even in the beginning of the 18th century, a French ship's boat had 7 men killed by the natives in landing on this coast; but in this instance they had landed before, and given umbrage to these Africans.

† It is called also Mount Felix, and Mr. Salt observes, that it might with more propriety be called Mount Elephant, from the Arabic "*Ras-el-Feel*," which is its true name, being the Elephas Mons, also, of the Romans.

passage so wide, that three ships may go abreast without danger up to a town, where he got plenty of wood and water; it is situated between Mount Felix and a low sandy point to the westward. Water

The Arabia Merchant's journal, 4th June, 1705, describes a low sandy point, or spit, to bear W. by S. 3 leagues distant from Mount Felix, betwixt which there is a bay with fresh water, and inhabitants, as they were informed by the natives.

The Discovery, from Mocha, 1st of October, 1701, sent her boat in shore, and the officer saw an inlet or river, about 2 miles to the West of Mount Felix, with the tide running out of it, but the water was salt. He was informed by one of the natives, through a linguist whom he had in the boat, that there was a tank of fresh water by the side of the river, and that they had goats and fowls for sale, but the officer did not put confidence in this information. The officer represented Mount Felix to be surrounded by the sea, he having gone round it, 2 leagues to the eastward; and in the journal of one of the following days, it is stated that about 4 leagues to the west of the Mount, he saw the *break* in the shore, where there runs a quantity of water out of the sea, which *vomited* itself on the east side of Mount Felix.

Ras Goree and adjacent coast.

RAS GOREE, or CAPE ST. PETER, in about lat. 11° 37′ N., distant about 16 or 17 leagues W.S.W. of Mount Felix, seems to be the 4th headland from the latter, the first being a low sandy spit, about 3 leagues to the westward of the Mount, with soundings between them from 14 to 6 fathoms near the shore, on which account the lead should be kept going until clear of the low sandy spit or point, and the shore ought not to be approached nearer than 2 or 3 miles. The next headland is about 4 leagues farther West, in a bay; the third headland is about 12 leagues from Mount Felix, the coast between them forming a concavity, being low to the distance of 5 leagues from the latter, then high for 5 or 6 leagues, terminating in a plain of middling height, which extends about 2 leagues W. by S. From the west end of this plain to Ras Goree, distant about 6 leagues, the coast is high, fronting a chain of rugged mountains; and about 2 leagues to the eastward of this cape, there is a white patch like a small sandy bay,* having to the westward a small river.

Mette Island.

METTE ISLAND, in lat. 11° 21′ N., lon. 48° 58′ E., or 2° 30′ West of Ras Jar d'Afoon by chronometer, bears about W. by S. from Cape St. Peter, distant 20 or 21 leagues: the coast between them forms a bight, is moderately elevated, and very uneven.—Inland, there are high mountains, and in lat. 11° 18′ N. about 7 or 8 leagues to the eastward of this island, close to the sea, in a bight, there is a Somaulee village: the soundings extend several miles from the shore.

About 3 leagues eastward from Mette Island, there is a peninsula of moderate height, covered with hummocks, which appear separated. Between this peninsula and the island there is a bight, the shore of which is not high, but the ridge of mountains continues inland. The island is of middling height, the highest hill on it re-

* It was probably near this place where a Portuguese frigate was wrecked in a bight near Cape St. Peter, in July, 1801, and part of the crew taken up by the Mornington.

The Discovery, on the 18th of September, 1701, anchored in 12 fathoms white sand, about 12 leagues to the westward of Mount Felix, where some of the natives spoke Arabic, who informed the Discovery's people that two Surat ships had been lost there, another captured by the pirates, and that they had no refreshments excepting a little salt fish.

sembling a cap or bonnet: the interior of it, and all the coast adjacent, appears arid and sterile.

Ais, or Burnt Island.

AIS, or BURNT ISLAND,* called also Bird Island, or White Island, in lat. 11° 14′ N.,† lon. 47° 24′ E., or 4° 4′ West of Ras Jar d'Afoon, by chronometers, and distant 27 or 28 leagues to the West of Mette Island, is a high barren rock of white aspect, being covered with bird's dung. The coast between it and Mette Island is moderately elevated, with soundings near it, and the channel between Ais Island and the main, is about 3 leagues wide, free from danger, with depths of 14 and 15 fathoms.

Fresh water.

Captain Thomas, of the Cecilia, landed on this island in 1801, and fonnd a spring of water on its southern part near the centre of the island; the water oozes out of the crevices of the rock, forming a small pool at the foot of the precipice, and with very little trouble a ship in want of water might obtain a supply, as there is good anchorage in sandy bottom opposite to the spot, and from thence round the east point of the island, so that a ship may anchor in safety, and avoid the strong westerly gales.

There was also found a remarkable cove, or rather a natural dock, sufficiently large to admit a ship of 300 tons in security, by clinching the ends of a cable through the holes of the rock, and the remains of 2 clinches of cables were really affixed to the rock at this time.

There appears to be no danger near the island, except at the western point, where a reef projects out about a cable's length, with a sunken rock, having over it only 12 feet water.

Somaulee Village.

SOMAULEE VILLAGE, is in lat. 11° 9′ N., about 3 leagues to the southwestward of Burnt Island, and here the soundings do not extend far from the coast, which, from this place, begins to take a more southerly direction, about W.S.W., and is high craggy double land: and about 16 or 18 leagues westward from Burnt Island, the coast trends still more to the southward of West, the land continuing high, craggy and double, destitute of soundings excepting near the shore.

About half-way between Burnt Island and Berbera, there is a projecting headland called Ras Kurrum.

Berbera.

BERBERA, in about lat. 10° 22′ N., lon. 45° 10′ E.‡ is situated at the bottom of one of the most considerable bays on this coast, bounded on the N.E. side by a projecting headland encircled by a reef. This place, although little known to Europeans, is frequented by trading vessels from the coast of Arabia and the adjacent parts, and it is said to afford good shelter, particularly to small vessels, but the natives ought not to be trusted.§ Caravans pass between this port and the interior of Abyssinia, to the westward and N.W.

* About a century ago Lakorgee was the name applied to it by the Moors. In lat. 11° 12′ N. about 7 leagues East of Burnt Island, the Phœnix and other ships, anchored about 3 miles off shore in 12 fathoms, where they lay a few days to repair the damage sustained by strong westerly gales, while beating up toward the Red Sea, in July, 1801.

† Mr. G. Rose, Master of H.M.S. Pandora, made it in lat. 11° 22′ N., lon. 47° 21′ E., in March, 1827.

‡ Mr. Rose, of H.M.S. Pandora, made it in lat. 10° 26¾′ N., lon. 45° 4½′ E., in 1827.

§ The propriety of this caution, given in the India Directory many years previously, was unfortunately verified by the English brig Marianne, belonging to Mauritius, having been attacked by some of the Soomah tribe natives of Berbera, in 1825, where several of her crew were murdered, the vessel plundered and burnt.

The

From Berbera the coast extends westerly, curving to the northward towards Kurrum Sheik, a headland, in about lat. 11° N., supposed to be fronted by shoals, having several bays or inlets between it and the former place, very little known. From Kurrum Sheik, the coast again turns more to the westward, for a considerable distance, then north-westward to the eastern point and islands of Zeyla Bay, being low in some parts close to the sea, with soundings near the shore; but about half-way between Berbera and Zeyla there is a high mount near the coast, called Mount Elmas.

Zeyla Town and Bay.

ZEYLA, in lat. 11° 17′ N., about lon. 43° 5′ E., is a town of some importance, having a trade with Mocha and the neighbouring parts. H. M. ship Sheerness, warped within some of the shoals of Zeyla Bay, and anchored near the town in 1800; having an Arab on board from Mocha as linguist, a treaty was made with the Chief of Zeyla, to supply sheep for the troops then at Mocha in transports, going on the expedition to Egypt, sheep being plentiful and cheap at Zeyla. The coast around this bay is low, fronted by extensive shoals to the North and N.W. about 3 leagues' distance from Zeyla; the island Ivat, or Sheik Deeni, being at this distance in a northerly direction, with a shoal surrounding it. The Island Sadduckdeen lies about mid-way between it and Zeyla, and there are other similar isles to the westward of these near the shore. The anchorage for large ships at Zeyla is about 3 or 4 miles N.N. Eastward of the town, to the eastward of the Island Sadduckdeen, in 4½ or 5 fathoms water, and the fair channel is to the eastward of all the islands. The soundings here extend a considerable distance out from the coast.

Anchorage.

Natives.

A ship touching here for refreshments ought to be guarded against treachery, for the inhabitants of the whole of this coast to Ras Jar d'Afoon, and round to the southward, have had little intercourse with European navigators during a long period, and are thought to be less friendly at present than they were upwards of a century ago, when European ships frequently obtained some refreshments in coasting along.

Ancient route to the Red Sea

At that time, English ships bound to the Red Sea often kept near the coast of Africa, till they got to the Straits of Bab-el-mandeb, and even in June and July, made their passage by this route.

The Arabia Merchant kept along the coast from Ras Jar d'Afoon, passed in sight of the islands in Zeyla Bay, and on the 16th of June, 1705, steering betwixt N.W. and North, in sight of the Abyssinian coast, very low land, with smoke in several places, got into 8 fathoms water, steered then North, with some hummocks seen a-head, which were on the main land, but mistaken for the islands at the entrance of the Straits, when at 5 P.M., the ship grounded about 4 or 5 miles off shore about lat. 11° 38′ N., the soundings were very uneven, differing 2 and 3 fathoms at a cast. She hove off at midnight, by an anchor laid out for that purpose, entered the Straits on the 20th, but having mostly N.W. winds and a strong current setting out of the Straits, she did not reach Mocha till the 27th of June. The Greenwich, 6th April, 1724, was in lat. 22° S., carried steady winds between S.W. and S.E. through the Mozambique channel, passed to the West of Comoro at 8 leagues' distance on the 12th, crossed the equator with southerly winds 18th, rounded Ras Jar d'Afoon 28th, and arrived at Mocha on the 6th of May.

Shoal Coast to the North of Zeyla.

The captain, the mate, and the other survivors, escaped to the trading dows which were at anchor near them, and were carried to Mocha, and from thence to Madras, where they arrived 2nd June, 1825, in the American brig Ann, Captain Millet.

From the northern extremity of Zeyla Bay, the coast extends in a northerly and north-easterly direction to Ras Bir, having the Island Missah or Oboe close to it in lat. 12° N.; Ras Bir is the easternmost promontory of the coast in this part, situated in about lat. 12° 17′ N., from whence it takes a northerly direction 5 or 6 leagues to the entrance of the Straits. This part of the coast is mostly steep, there being 25 and 27 fathoms water within half a mile of the shore in some places.

Although formerly ships kept along the African coast nearly to the entrance of the Red Sea, it is now the practice to stretch off from it at Burnt Island for the coast of Arabia about Cape Aden, or Cape Arimora.

# RED SEA.

Although the Red Sea forms no part of the ordinary route of our East India ships, its immediate connection with the Indian Ocean has always been considered a sufficient reason for including it in the Directory, and the further claim which it now has of constituting an important link in the chain of our mail communication with India, renders its insertion the more imperative.

The notice of the Red Sea given in the former editions of this work was, from the scantiness of our information, necessarily brief and imperfect; but full directions by Captains Moresby and Elwon, of the Indian Navy, to accompany their four-sheet Chart of this Sea, having recently been published by the East India Company, we are now enabled by the liberal permission of the Honourable Court of Directors to give these valuable Directions verbatim.

## SAILING DIRECTIONS FOR THE RED SEA.

BY R. MORESBY AND T. ELWON, Esqrs., COMMANDERS INDIAN NAVY.

### INTRODUCTION.

The Directions for the Southern part of the Red Sea, from the Straits of Bab-el-Mandeb to Jiddah, have been extracted from the memoir written by the late Commander Thomas Elwon, of the East India Company's Ship *Benares*, to accompany his portion of the survey. For the part north of Jiddah, the directions were written by Commander Robert Moresby, of the East India Company's ship *Palinurus*, by whom that part of the survey was executed.

The names in the Arabic character on the Chart were written by Mr. Rassam, a gentleman who accompanied Colonel Chesney to England as interpreter. The longitudes have been determined by chronometric measurements from Bombay to Maculla, Maculla to Mocha, and from Mocha to Jiddah, made during the years 1829, 30, 31, 32, 33, and 34, an abstract of which is given by Capt. Moresby—Bombay being considered in 72° 54′ 36″. The trigonometrical survey of India, based upon the longitude of Madras, which is considered to be 80° 17′ 21″,* placed the longitude of Bombay about three minutes more west, *viz.* 72° 51′ 15″.

* Recent observations make it in 80° 14′ 0″, which, if confirmed, will of course affect the position of Bombay, as well as all those places depending upon it.

## ABSTRACT OF CHRONOMETRIC MEASUREMENTS.

### FROM BOMBAY APOLLO PIER TO MACULLA.

| | | ° | ′ | ″ |
|---|---|---|---|---|
| Palinurus' Watches in 1830 | 1st | 23 | 29 | 0 |
| | 2nd | 23 | 54 | 30 |
| Ditto ditto in 1832 | 1st | 23 | 43 | 0 |
| | 2nd | 23 | 50 | 0 |
| | 3rd | 23 | 45 | 30 |
| | 4th | 23 | 44 | 45 |

Mean diff. of longitude between Bombay and Maculla 23° 46′ 7″.

### FROM BOMBAY APOLLO PIER TO MOCHA.

| | | | | |
|---|---|---|---|---|
| Benares' Watches in 1829 | 1st | 29 | 35 | 24 |
| | 2nd | 29 | 31 | 34 |
| | 3rd | 29 | 37 | 2 |
| Ditto ditto in 1831 | 1st | 29 | 38 | 9 |
| Ditto ditto in 1831 | 1st | 29 | 37 | 31 |
| | 2nd | 29 | 39 | 6 |
| | 3rd | 29 | 37 | 6 |
| Palinurus' Watches in 1832 | 1st | 29 | 33 | 23 |
| | 2nd | 29 | 41 | 16 |
| Benares' Watches in 1834 | 1st | 29 | 39 | 15 |
| | 2nd | 29 | 40 | 15 |

Mean diff. of longitude between Bombay and Mocha, 29° 37′ 18″.

### FROM MACULLA TO MOCHA.

| | | | | |
|---|---|---|---|---|
| Palinurus' Watches in 1832 | 1st | 5 | 50 | 45 |
| | 2nd | 5 | 51 | 30 |

| | ° | ′ | ″ |
|---|---|---|---|
| Mean diff. of longitude between Maculla and Mocha | 5 | 51 | 7 |
| Ditto ditto Maculla and Bombay | 23 | 46 | 7 |
| Diff. of longitude between Bombay and Mocha | 29 | 37 | 14 |

### FROM MACULLA TO JIDDAH.

| | | | | |
|---|---|---|---|---|
| Palinurus' Watches in 1829 | 1st | 9 | 52 | 0 |
| | 2nd | 9 | 53 | 15 |
| | 3rd | 9 | 51 | 46 |
| Ditto ditto in 1830 | 1st | 9 | 53 | 46 |
| | 2nd | 9 | 51 | 16 |
| Ditto ditto in 1832 | 1st | 9 | 53 | 45 |
| | 2nd | 9 | 51 | 45 |

Diff. of longitude between Maculla and Jiddah 9° 52′ 30″.

### FROM MOCHA TO JIDDAH.

| | | | | |
|---|---|---|---|---|
| Benares' Watches in 1829 | 1st | 4 | 3 | 1 |
| | 2nd | 3 | 59 | 17 |
| Ditto ditto in 1831 | 1st | 4 | 3 | 39 |
| | 2nd | 4 | 2 | 33 |

| | ° | ′ | ″ |
|---|---|---|---|
| Mean diff. of longitude between Mocha and Jiddah | 4 | 2 | 7 |
| Ditto ditto Mocha and Maculla | 5 | 51 | 7 |
| Diff. of longitude between Maculla and Jiddah | 9 | 53 | 14 |
| Mean diff. of longitude between Maculla and Jiddah | 9 | 52 | 52 |
| Ditto ditto Maculla and Bombay | 23 | 46 | 7 |
| | 33 | 38 | 59 |

Making Jiddah in 39° 15′ 37″ East longitude from Greenwich, allowing Bombay to be in 72° 54′ 36″.

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# SAILING DIRECTIONS.

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### FROM THE STRAITS OF BAB-EL-MANDEB TO MOCHA.

Bab-el-mandeb Straits. Perim Island.

THE STRAITS OF BAB-EL-MANDEB are $14\frac{1}{2}$ miles wide at the entrance, between Bab-el-mandeb Cape and the opposite point or volcanic peak, called Jibbel Seajarn. Near the former cape is Perim Island, which divides the two Straits at the entrance, the larger being about 11 miles wide. Perim is a bare rocky island, about $4\frac{1}{2}$ miles long by 2 broad, rising 230 feet above the level of the sea, and without fresh water or inhabitants. On its S.W. side is a good harbour nearly half a mile broad, with an entrance half a mile wide, with 6 and 7 fathoms water, and a muddy bottom. The harbour forms in two branches, and that to the N.W. appears the best: there might be some difficulty in getting out of this place in southerly winds, and it might be found necessary to warp to the southernmost point of the island, to clear the west side of the entrance. A bank extends off the north part of Perim half a mile, with 4 and 5 fathoms on its outer edge; it commences at the N.E. part of the island, gradually increasing to the north, and from thence slopes away to the island, and ceases on the N.W. part.

Perim Harbour. Shoal Bank.

Little Strait. Fisherman's Rock.

The narrowest part of the Little Strait is nearly $1\frac{1}{2}$ miles wide, from the N.E. part of Perim Island to FISHERMAN ROCK, called also Pilot Island or Oyster Rock, on account of the abundance of excellent oysters found on it. From Fisherman Rock to the lower cape of Bab-el-mandeb to the North, is all shoal water in rocky patches, but there are 11 fathoms a little without this rock, gradually increasing to the centre of the channel, where there are 12, 16, and 17 fathoms hard sand, and 7 and 5 fathoms close to the island of Perim. There are also 6 and 7 fathoms water in a small bight to the south-eastward of the Fisherman Rock, at the termination of the reef off that island.

Anchorage.

Ships may anchor under Bab-el-mandeb Cape in $6\frac{1}{2}$ fathoms water, with the cape bearing S. by W., (*true*), and the extremes of Perim Island from S. 15° W. to S. 12° E. (*true*).

Zee Hill and Shoal.

From Perim Island $16\frac{1}{2}$ miles N. $1\frac{1}{2}$° E. (*true*) is ZEE HILL, and 40 miles N. 14° W. (*true*) is the town of Mocha. Zee Hill is a small but remarkable peak of rocky land like a gunner's quoin, close to the beach; there is no other like it, hereabouts, the land being low, with high hills in the interior; this hill has shoal water running off it, with 5 fathoms on its outer edge, which continues to some distance southward. At 4 and 5 miles to the southward of Zee Hill, are 2 reefs with 3 fathoms between them and the shore; the latter has 2 fathoms on it, and there are 5 or 6 fathoms close to their outer edge. The soundings along the coast are tolerably regular, and the lead is a sufficient guide in approaching it.

Mocha.

MOCHA. The town of Mocha is enclosed by a wall with several forts and towers, occupying a space about half a mile square; many of the buildings within it are in ruins or in a state of great decay. The houses generally are large and built with stone: there are also several mosques with lofty minarets, and the whole being whitened with *chunam* has an imposing effect when seen from sea. It has several batteries towards the sea, namely, the centre or jetty battery, a little north of which, opposite the old factory, is a five-gun battery; and beyond that is the north fort, on a sandy spit to the N.W. of the town. The south fort is in a ruinous state upon a sandy beach to the S.W. of the town. This place has an extensive bazaar, and is well supplied with beef, Abyssinian sheep, fruits, and vegetables; very good bread may also be had, but there is no biscuit. The water is brackish and dear.

Supplies.

MOCHA ROADS lie to the westward of the town, and the depth is moderate, from 3 to 6 fathoms; but there are three shoal rocky patches which should be avoided in sailing in or out, and in anchoring. One of these lies one mile due West from the south port; it is about half a cable length over, has 2 fathoms on its shoalest part, and from 3 to 6 fathoms close to it: the other is nearly 2 miles to the S.W., is about the same size, has $2\frac{1}{2}$ fathoms on it, and 4 fathoms close to it; between it and the shore are 7 and 6 fathoms. The third lies about 3 quarters of a mile W. by S. (*true*) from the north fort, is a cable length over, with $2\frac{3}{4}$ fathoms as the least water, and $3\frac{1}{2}$ fathoms between it and the fort. Variation 6° 30′ W. in 1831. Mocha Roads.

## DIRECTIONS FOR APPROACHING MOCHA FROM THE SOUTHWARD AND ANCHORING IN THE ROADS.

SHIPS having entered the Straits of Bab-el-mandeb and passed Perim Island, should steer along the Arabian coast about N. by W. $\frac{1}{2}$ W. or N.N.W. (*true*), keeping without the depth of 12 fathoms, in order to avoid a shoal said to exist between Cape Bab-el-mandeb and Zee Hill, but which the surveyors could not discover, and also to keep clear of the sand and rocky banks which project from Mocha Roads. Perim Island to Mocha.

When the mosque bears E. 15° N. (*true*), a ship will be off the westernmost part of Mocha sands, and may haul to the N.E., keeping along the edge of the bank and anchor in 6 or 7 fathoms, with the north fort bearing true East, distant 2 or $2\frac{1}{2}$ miles; or run in with this true bearing of the north fort, and anchor in 5 or 4 fathoms with the south ruined fort bearing S. 20° E. (*true*). Vessels drawing only 13 feet may stand closer in and anchor in 3 fathoms. The north fort bearing East, carries a vessel pretty close to the north part of the northern rocky patch on the outer banks. Anchorage in Mocha Outer Road.

### DIRECTIONS FOR PASSING INSIDE THE BANKS.

After passing Zee Hill (before described) keep along the coast in 7 or 6 fathoms, and when the north fort bears N. 35° E. (*true*), steer for it, or keep it a little more to the North to make sure of passing on the inside of the $2\frac{1}{2}$ fathoms patch, before the south ruined fort and mosque are in one. Anchorage in Mocha Inner Road.

This course will lead between the south ruined fort and a 2 fathoms patch West of it in 3 fathoms: in this depth is the most convenient anchorage West of the jetty, between the northern rocky patch and shore reef. This inner anchorage is only half a mile wide.

Of the high land within Mocha, there is a remarkable piece of table-land called Jibbel Nar or Barn, which when on with the mosque at Mocha, bears East; to the southward of this and to the S.E. of Mocha, is another remarkable part of the highest land, appearing as if covered with ruins, and named South Peak. High land within Mocha.

## COAST OF AFRICA, FROM JIBBEL SEAJARN TO RAS BILLOOL.

THE S.W. point of the Straits of Bab-el-mandeb is distinguished by a peaked hill named Jibbel Seajarn, and to the eastward of it about 6 miles, are six small volcanic islands called THE BROTHERS. The northernmost of these, named the High Brother, has 29 fathoms close to it, and is about 9 miles South of Perim Island, the Large Strait lying between them. The Brothers.

N. 38° W. (*true*), distant 17 miles from the point of Jibbel Seajarn, is DOOMAIRAH ISLAND, lying at a short distance from the Abyssinian Coast. Two small rocks, about 7 feet above water, lie N. 27° W. (*true*) from Jibbel Seajarn, at about $1\frac{1}{2}$ miles from shore; 20 fathoms are near to them, and an irregular channel between them and the main: between these rocks and Doomairah Island the soundings along the coast appear to be regular. Doomairah Island is about half a mile square and of great height, running up to a remarkable sharp peak in the centre, called Jibbel Doomairah. The island is but a short distance from the main land, from which it is separated by a narrow channel of 5 fathoms; there is a small rocky island nearly joining it to the eastward, and a rocky shoal of $2\frac{1}{2}$ fathoms about a mile from it to the northward. To the N.W. of the island, and beyond the shoal just mentioned, the coast forms a small bight which extends afterwards to the North and N.W. to a low sandy and swampy cape called RAS SINTUAR, in which space the soundings gradually decrease to the shore. Doomairah Island. Ras Sintuar.

At about 7 miles from Doomairah Island a reef commences near the shore and runs to N.N.W. and N.W., terminating in a point formed by its western edge at the distance of 5 miles North of Ras Sintuar. The point of this reef is called RAS MACAWA. It extends about $4\frac{1}{2}$ miles East (*true*) of Ras Sintuar, and has on its western edge several islands forming the east side of the eastern channel into Assab Bay, fit only for very small craft. The soundings appear pretty regular in approaching the east side of this reef to 5 fathoms on its edge, and to the depth of 30 fathoms from 4 to $4\frac{1}{2}$ miles off it. Reef. Ras Macawa.

ASSAB BAY.—This bay is nearly 16 miles in length and upwards of 5 miles in width in the broadest part, but there are many small and low islands in the entrance forming small channels into it, from half a mile to one mile in breadth. It is bounded to the S.E. and East, by a bank of islands extending off the coast, of which Ras Macawa is the extreme, and which has already been described, and by others which bound it on the N.E. and North, the largest of which, called DARMABAH, lies within the bay, and is nearly 20 miles in circumference, very low, and partly covered with jungle. To the northward of Darmabah and westward of Darmabah Island.

Reef. Jeserat Dilcose, and Jeserat Fartmar.

Ras Macawa, is a reef extending W. by N. ½ N. (*true*) about 7 miles, with an island on and near each end; that to the East, called JESERAT DILCOSE, and the one on the west end about 2 miles long, covered with wood, JESERAT FARTMAR.—This reef is about 3 miles wide, and forms with the north side of Jeserat Darmabah one of the principal channels into the bay; its entrance is between Ras Macawa and Jeserat Dilcose, the depth being from 10 to 6 fathoms. The channel to the S.E. of Darmabah is very narrow, and has at the most 2 fathoms. There is a small bank of 5 and 6 fathoms lying about 4 miles N. 18° E. (*true*) of Ras Macawa (a low woody island before spoken of), with 12 fathoms to the S.W. of it, gradually decreasing to 6 fathoms off the eastern part of the north shoal that extends from Jeserat Dilcose leading into Assab Bay between it and Ras Macawa. There is also a 2-fathom shoal one mile West (*true*) of Jeserat Fartmar: and another shoal is said to be to the North of that Island.

Entrance to Assab Bay.

The best entrance into Assab Bay is between the 2-fathom shoal off Jeserat Fartmar and the opposite projecting cape of the coast called Ras Loomar, distant about 2½ miles. Steer from thence to the South, passing to the eastward of two small sandy islands surrounded by a reef, lying off a small bight in the coast to the southward of the cape, and leaving all the other islands to the eastward. The soundings inside the bay are 6 and 7 fathoms, mud.

Wood and water.

Wood may be procured on the islands, but water is scarce and brackish, and only to be found at three wells a little to the South of Ras Loomar.

Sunnahboar Island.

Off the north part of Ras Loomar is a high pyramidal rocky island, small in circumference, bounded on the S.E. and West by a bank extending three-quarters of a mile from it, with a narrow channel between it and the shore, with 5 and 6 fathoms water in it; it is called SUNNAHBOAR, and is in lat. 13° 4′ N.

Ras Billool.

Fourteen miles N. 47° W. (*true*) from Sunnahboar Island is RAS BILLOOL. The soundings are regular along this part of the coast and the little reef off it, till within 5 miles of the cape, where it is more indented with some low sandy islands on a reef which extends about one mile off shore, and terminates at the N.E. part of the cape. The land of Ras Billool is rather high, with an oblong hill jutting out to the North about 2 miles, which forms a square cape with a bay on its west side. There is little or no reef off the north side of the cape or on its western side. BILLOOL BAY is upwards of 7 miles broad East and West, and 3 miles deep. Two miles S.W. of the inner part of the cape is a small island surrounded by a shoal on the S.E. and West, having between it and the coast 5 fathoms. There is also a bank to the W.N.W. of the cape, distant from it 3½ miles. It is of circular form, 2 miles broad, and has mostly 2 fathoms on it: there is apparently a channel between it and the main about 2 miles broad, as the soundings inside the bank were 10 and 11 fathoms mud, and 12 on its east side. In the outer part of the bay there are 16 and 14 fathoms very gradually decreasing inward. This bay affords excellent protection from southerly winds, but is quite open and exposed to those from the North.

Billool Bay.

Neither village nor inhabitant was seen in the neighbourhood; but the pilot said that there is a small village called Billool, about 2 miles in shore on the eastern side of the bay, and that there is a trade from this place to Mocha.

Description of the land in the interior.

The appearance of the land from the Straits to this place is high, rugged, and mountainous towards the interior, quite barren, and decreasing in several ranges towards the coast, where there are several remarkable and detached hills of great elevation; those that were visited were rocky, and had a covering of coarse, granular, black and lightish brown earth, intermixed with iron-stone, which on Ras Billool had considerable effect upon the needle of the compass.

Jibbel Seajarn. Jibbel Doomairah.

JIBBEL SEAJARN, as before mentioned, is a peaked hill of the haycock shape, situated upon a point of land forming the western side of the large Strait of Bab-el-mandeb, at the entrance of the Red Sea. JIBBEL HADDALLY is a remarkable lump on the nearest range of hills, 15 miles to the westward of Jibbel Seajarn. JIBBEL DOOMAIRAH, already described, is on the island of that name, off Ras Doomairah; it is called by Captain Court, the Premenas.

Jibbel Abbooloo. Beach Hummock. Jibbel Marsub. High Saddle. First and Small Peaks. Haycock Hill. Ras Billool. Cap Hill. Booby Hill. Barn Hill and Chimney Peak.

JIBBEL ABBOOLOO is a small piece of table-land in the near range of hills, about 14 miles W.S.W. of Doomairah Island. BEACH HUMMOCK is the larger of two conical hills to the south-west of Assab Bay; JIBBEL MARSUB, or SMALL SADDLE, so called from its resemblance, is 3 miles to the south-westward of Ras Loomar, the north point of entrance to Assab Bay. HIGH SADDLE is 9 or 10 miles in a direction nearly West of the Small Saddle, and resembles it in some views, but is much more towering, being part of a higher range. FIRST and SMALL PEAKS are two remarkable hills or pyramids between the Saddles; and HAYCOCK HILL is of a similar shape, but situated 3 miles to the W.S.W. of the high small island of Sunnahboar, near the coast, and already mentioned. RAS BILLOOL is an oblong hill, rather high, and jutting out to the North. CAP HILL is a small round hill in the south part of Billool Bay; and 3 miles W.S.W. of it is another hill, resembling Paps, and called BOOBY HILL. 26 miles West of Ras Billool there are two remarkable elevations upon a range and near each other, which we have called BARN HILL and CHIMNEY PEAK, from their resemblance thereto. Further to the N.W. the land is high and mountainous, but was only seen occasionally, in consequence of hazy weather.

## THE ISLANDS AND ROCKS BETWEEN RAS BILLOOL AND JIBBEL ZOOGUR, INCLUDING THE MAH-HEB-BAKAH GROUP AND HARNISH ISLANDS.

THE first of these is a small rocky island of considerable height, called SAYEL, lying 6 miles N. by E. (*true*) from Ras Billool; about 5 miles E.N.E. (*true*) of Sayel is a similar white rocky island, called HARBEE. About N. ½ W. (*true*), 5 miles from Sayel, is a small but high rocky island, and at 3 miles N.E. by N. from it is a similar one; these are the south-westernmost of a group of five, called the MAH-HEB-BAKAH ISLANDS. The three northernmost of these islands (the centre one of which resembles a haycock) are higher than the other two, and are near each other, with deep water between them. About N.N.E. (*true*) 7 miles from the north-easternmost of the Mah-heb-bakah Islands, lies the S.W. end of GREAT HARNISH ISLAND, in lat. 13° 39′ N. and lon. 42° 44′ E. From thence it extends about 10 miles N.E. ½ N. and is three miles in breadth at the broadest part; the highest part is near the centre, which forms in some views a remarkable bluff. There is a good deal of grass in the valleys, and plenty of antelopes. The west side of this island is steep, having no bottom at 100 fathoms close to, in some places; but along the eastern side the soundings are tolerably regular, affording anchorage from northerly winds. One of these anchorages has a depth of 11 or 12 fathoms near the N.E. end of the island, with a small island called the Haycock, bearing North; here the bottom is sand and rock: but the best is near the S.W. end of the island, in 16 fathoms sand, with Double Peak Island to the East.

Sayel Island. Harbee Island. Mah-heb-bakah Islands. Great Harnish Island. Anchorages. Haycock Island. Double Peak Island.

### ISLANDS AND ROCKS ADJACENT TO GREAT HARNISH ISLANDS.

SULE HARNISH ISLANDS, three in number, connected by a reef, are about 2½ miles from the S.E. part of Great Harnish, with a good channel between, there being 20 fathoms close to these islands, the same on the edge of the Great Harnish sandy bay anchorage, and 23 in mid-channel, deepening to 30 south of the S.E. part of Great Harnish. They are of considerable height: the northern one is very steep, with two small peaks close together, from whence we called it Double Peak Island; the southernmost is nearly 2 miles long and 1 broad, and is high and rugged, and hence its name. To the eastward of these islands, from 1 to 2 miles, is ROUND ISLAND, and ROCK ISLAND, with channels of 22 and 25 fathoms between: the former is rather high and rocky; the latter consists of low black rugged rocks, and 2½ miles to the eastward of it is a rock above water. ROUND and QUOIN ISLANDS, so named from their shape, are 1¼ to 2 miles from the centre of the eastern side of Great Harnish, with a channel of 26 fathoms along Great Harnish, but there were no soundings taken between them. The remains of a crater were found on Round Island: two miles S.W. of it, and half a mile from Harnish, are some black rocks above water, with 9 fathoms rocks near them on the East, 12 and 17 half a mile off, and 27 between them and Round Island. HAYCOCK is off the north part of Harnish, separated from it by a narrow channel of 9 and 10 fathoms; it resembles a haycock from the South, but on passing close to the eastward of it the inside appears to be hollowed out like a saucer. ADDAR EYLE, or Sugar-loaf, are two small pyramidal rocks of some height, one mile east of the Haycock, with a channel of 35 fathoms between; they are of the same colour as the latter island: and MOOSHEDGERAH is a low small island 3 miles East from the north part of Great Harnish. Besides these, there is a rock above water, at 2 miles, and another at 4½ miles off the south part of Harnish, and a cluster of rocks awash and a little above water 6 miles to the westward of the south point of Harnish, or 6 miles N.N.W. of the Haycock Island, forming the N.E. part of the Mah-heb-bakah Islands, with good channels between.

Sule Harnish Islands. Round and Rock Islands. Round and Quoin Islands. Haycock Island Channel. Addar Eyle. Mooshedgerah. Rocks above water.

LITTLE HARNISH ISLAND is about 4 miles North of Great Harnish, with a good channel of 35 to 40 fathoms between them. It is of an oblong shape, of great height, with a remarkable piece of land on the summit of the east end, resembling a thumb or a small peak in the act of falling off the top of the land, when observed from Great Harnish Island, and hence we have named it TUMBLE-DOWN PEAK. This island is upwards of 7 miles in circumference, very rugged, with grass in some parts, and a few antelopes. On the N.E. and East, about half a mile from it, are some rocky islands, a part of them connected to the north part of Little Harnish by sunken rocks, but there is a narrow channel of 15 or 16 fathoms between them on this side, and on the other side is deep water.

Little Harnish Island. Tumble-down Peak.

JIBBEL ZOOGUR.—About 2 miles to the northward of Little Harnish is the south end of Jibbel Zoogur, with a good channel of 36 and 37 fathoms, mud, between them. Zoogur is by far the highest island in this sea, and may perhaps be considered a small mountain; it is 28 miles in circumference, and nearly 9 miles long from South to North, composed of a series of lofty hills of barren aspect, which in some views appear as sharp peaks, but on running along by the east side of the island they assumed the appearance of the inner side of a funnel. The highest peak in the island is about 3 miles to the north of an anchorage in the western bay, inside of Sandy Peak Island, hereafter described.

Jibbel Zoogur. Highest Peak.

The only apparent good anchorage about this island is in the two small sandy bights on the S.W. part of it,

Anchorages.

the easternmost of which is the largest, though perhaps the least commodious, as the smaller one appears to be that used by the native boats, where there are a few straggling huts and some trees. These anchorages are in the bottom of a small bay, in breadth two miles and depth one, formed by Sandy Peak Island on the West, which is separated from a point of Zoogur, between which is a channel of 70 yards width, with 7 fathoms from side to side. Across the entrance of the bay the soundings are 30 to 36 fathoms, with an irregular decrease, there being 9 fathoms at a short distance from the shore reef in the western bight, and 9, 13, and 15 fathoms in the eastern. From the situation of this bay, it affords good protection from a northern sea.

Sandy Peak Island.

As there is no protection on the Arabian coast opposite Zoogur, it may be as well to say something more of its north side, where the Palinurus anchored against strong South winds, in March, 1831. On the N.E. part of the island is a sandy spit, and 1 mile north of it is a small island, called High Island: the soundings between them is 17 fathoms sand, near the spit, increasing to 24 near the North Island. In this space the ship anchored in 22 fathoms mud; but to avoid being too near the small island, it would be better to anchor more to the westward, where there are 15 fathoms near the shore reef, and 24 and 30 at half a mile from it. The most eligible place, in cases of emergency, appears to be on the N.W. part of Zoogur, where there are 7 to 10 fathoms close in, and 23 fathoms at half a mile off. On the north side of the island the wind blew in severe gusts off the high land, but the water was quite smooth.

High Island. Anchorages.

Good water may be obtained about $1\frac{1}{2}$ miles to the northward of the bay formed by Sandy Peak Island (where they anchored in 9 fathoms sand) by digging a hole in the sand, which is black; but it is difficult to get it off in casks over the rugged reef, with which the shore is lined. Wood may also be had on the north and south parts of the island, and grass in some of the valleys, where antelopes were found. There are no people constantly residing on this island, but it is resorted to by fishing-boats from Maculla, for a cargo of the Red Sea productions, amongst which are sharks' fins, salted fish, and turtle.

Good fresh water. Wood.

TONGUE ISLAND, so called from its shape, is more than 2 miles from the S.W. end of Zoogur, with a small island and some sunken rocks near its east side, and 34 fathoms between them in a small bight. These rocks are a part of the reef which extends in patches from the N.E. end of the island to the small island close to it on the S.E. There is a small island about a mile W. by N. from Sandy Peak Island. ABOO EYLE ISLANDS are off the N.E. part of Zoogur, and are of considerable height. High Island is the westernmost of them, and is rather flat at top; the other three are close together. The westernmost we have called Quoin Island, and the easternmost Pile or Lump Island. The N.E. point of Zoogur is in lat. 14° 5′ N. and lon. 42° $48\frac{1}{2}$′ E.

Tongue Island. Aboo Eyle Islands. Quoin and Pile Islands.

## GENERAL DESCRIPTION OF THE GROUP OF ISLANDS AND ROCKS EXTENDING BETWEEN RAS BILLOOL AND JIBBEL ZOOGUR.

THE islands comprising this group are mostly volcanic hills of a dark and barren aspect, with rocky eminences in fanciful or romantic shapes, covered with a loose granular black, brown, or sandy coloured earth and ashes, or strewed with pieces of sharp rock. The principal, as before stated, are the Zoogur and Harnish Islands, which are surrounded by many small ones of various heights, to which appropriate names have been given, according to their different shapes. In some of the largest the remains of craters are very evident, having all the appearance of being originally high peaked islands, reduced to the present saucer shape by internal explosions; and the neighbouring smaller islands and rocks to the E.S.E., South, and S.W. of Harnish, being of similar formation, leads to a belief that they have been formed by the same means. No sunken patches were discovered between any of this group from Ras Billool to Zoogur, all the dangers being above water, so that vessels running either up or down this sea can pass through any of these channels during the day with safety; but it may be advisable not to attempt to pass through the smallest ones beneath the north-easternmost of the Mahheb-bakah Islands, or through the 9 fathoms channel between the north part of Harnish and Haycock Islands off it, for fear of baffling winds.

## THE COAST OF YEMEN FROM MOCHA TO LOHEIA WITH THE ISLANDS FORMING THE INNER CHANNEL AND OTHERS, ACROSS THE OUTER REEF TO THAT PLACE, WITH THE ZEBAYER ISLANDS AND JIBBEL TEER.

ABOUT N. $\frac{1}{2}$ E., 16 miles from Mocha, is MERSA FEDJERAH, fit only for boats in less than 4 fathoms, to the south of which the coast projects a little, and in some degree breaks off the swell in southerly winds. Between Mocha and this place the soundings are regular. Seven miles further north is the village of MOUSA, where good water may be obtained; it may be known by a small white mosque on its point. To the north of Mousa $4\frac{1}{2}$ miles is the village of COCHA. Sh'haree is also a small village where good water may be procured: it is about 9 miles N.N.W. from Mousa, and may be known by a small white mosque on a cape about $1\frac{1}{2}$ mile to the N.W. of it, called Goobut-el-Hamar. The soundings being regular along the coast from Mersa Fedjerah, a vessel in want of water may anchor in any convenient depth off the said places to obtain it. About

Mersa Fedjerah. Mousa. Good water. Cocha and Sh'haree. Good water. Goobut-el-Hamar.

11½ miles N.W. (*true*) from Sh'haree and 41 miles N. by W. (*true*) from Mocha, is RAS MILTANAH, and to the North of it, to the distance of 2 miles, three small rocky patches on which the sea breaks. This cape is in lat. 14° 0′ N., the east side of Jibbel Zoogur being 16 miles West of it, the soundings deepening gradually from the coast, and the deepest water between is 39 fathoms. Three small pyramidal hills, called the THREE SISTERS, or JIBBEL MOUSA, are near the coast between Mersa Fedjerah and Mousa. Ras Miltanah. Three Sisters, or Jibbel Mousa.

Seven miles North of Ras Miltanah is RAS ZEBEED, off which is a small shoal on which the sea breaks, and about 1 mile to the N.E. of it is an excellent spring of fresh water, emptying itself into the sea. The rushes about its mouth are easily distinguishable from the anchorage off it in 4½ fathoms, and there are also some trees and bushes in its neighbourhood by which it may be known. Jibbel Zoogur Peak bears from this anchorage S. 74° W. (*true*); and it is to be observed that this being an open coast, if there is any surf on the beach it will be difficult, and even dangerous, to attempt getting water here at such times. N. 5° W. (*true*), distant 7½ miles from Ras Zebeed, is KEDF OCRAISH BLUFF: N.N.W. ½ W. (*true*), 23 miles from this bluff, and N. 17° W. (*true*), distant 37 miles from Ras Miltanah, is a long projecting point of land called RAS MEJARMLA. This is the N.W. point of an inlet of the sea running in to S.S.E. about 10 miles, called CORE GOULAFUGGER, near the extremity of which is a small sand-hill, in form of a haycock, called KEDF MUCKYESH, seen in clear weather when approaching Ras Mejarmla from the southward. At the distance of 3½ and 7 miles S. by E. and S. by E. ¾ E. (*true*) from Ras Mejarmla, are two shoal patches of 1 and 2 fathoms, about 1 and 1½ miles from the coast, with 4 fathoms near them; and at 7½ miles S.W. by S. (*true*) is a patch of 5 fathoms, with 28 fathoms close outside and 15 within it. Two miles West of the cape is a shoal of 2 to 4 fathoms about 3 miles in length N. by E. and S. by W., and a mile broad, with 12 fathoms close to its outside; between it and the cape are 9 to 4 fathoms. The north part of the cape or Ras Mejarmla is about 3 miles wide, and 2 miles East of it, on the east side of Core Goulafugger, at a place called SHOORAME, about a mile or more inland, over a beach of soft sand, are some wells of good water. To the North of the cape is anchorage against southerly winds in 4, 5, or 6 fathoms, and within, to the S.E. of the cape, against all winds, in about 3 fathoms; but there may be some difficulty in getting out against those from the north-westward. About N. ½ W., distant 14½ miles from Ras Mejarmla, is RAS JEDDERE, the coast between them forming a bight in which the soundings are tolerably regular, with the exception of two patches of 2 fathoms each at 4 and 6 miles North of the former, and the reefs off Hodeidah, which extend about 2 miles to the West of it. Ras Zebeed. Fresh water. Kedf-Ocraish Bluff. Ras Mejarmla. Core Goulafugger. Kedf Muckyesh. Shoorame, good water. Ras Jeddere.

HODEIDAH is about 11½ miles N. by E. (*true*) of Ras Mejarmla, and about 5 miles south-eastward of Ras Jeddere. It is a large fortified town with lofty buildings, but not so extensive as Mocha. It is one of the coffee ports, and has a considerable bazaar, from whence supplies may be procured. There is said to be plenty of good water, which the natives will bring off in their boats. Vessels may anchor in 4 fathoms, just to the westward of some small patches of reefs in the roads, for which a good look-out is necessary, as the water does not always break upon them. Between 2 and 3 miles to the southward of the town a shoal spit runs off more than a mile, with 1 fathom on its extremity. Hodeidah is in lat. 14° 47′ N., and lon. 42° 59′ E. Hodeidah. Supplies. Anchorage.

About 2 miles West of Ras Jeddere is a patch of 2 fathoms, with 3 fathoms near to it to the N.W., and midway between it and the cape is a rock. Four miles further North is Ras Keteeb, the extremity of a point or tongue of land, forming a bay or inlet to the south-east. East of this cape about 2 miles is a low island on a reef, extending 1¼ miles from shore; and nearly 6 miles North of the cape is another projecting cape, without a name, forming between them a bay in which the depths are irregular. N.W. by N., distant 18 miles from Ras Jeddere, is RAS EL BAYATH, and S.E. from it 5 miles is RAS ESSAH. To the eastward of the latter is a bay of the same name, where a ship may anchor in 8 to 5 fathoms, sheltered from northerly winds, but she must quit it on the appearance of the wind coming from the southward or westward. From Ras el Bayath round Ras Essah, the shore is bordered by a reef, steep-to; and nearly 4 miles S. by W. from the former is a low island or sand-bank called RASHER, surrounded with a reef, and with 14 fathoms between it and the main. Ras Keteeb. Ras el Bayath. Ras Essah. Rasher.

From Ras el Bayath the coast turns N.E. ½ N. (*true*) about 9 miles to a sharp point of land named RAS ARAFAR, forming between them a bay called Camaran, the north point of which, Jibbel Maharsene, is a piece of high land, having below it a mosque. Twenty miles North of Ras Arafar stands the town of LOHEIA; the coast forms a bay to the S.E. of the former, and from thence an irregular shore up to the latter, fronted all the way with a reef, which 5 miles south of Loheia extends 2½ miles from shore. Ras Arafar. Jibbel-Maharsene.

CAMARAN ISLAND.—The S.E. point of this island lies nearly 1½ miles N.W. of Ras el Bayath; it extends from thence in a N. by E. direction above 11 miles, and is from 2 to 4 miles broad. The island is composed of hard rock intermixed with sand, and in some parts earth capable of cultivation; there are some spots on which date trees flourish. The island is generally low, but towards the South there are some elevated parts forming small hills, and on the North it is swamp and jungle. Including Camaran, there are seven small villages upon this island, mostly consisting of a few miserable huts belonging to fishermen employed in its neighbourhood on the pearl banks, turtle islands, &c. Excepting a small portion of its east side, the island is bordered by a reef, which, off its S E. point, extends little more than a mile towards Ras el Bayath, whereby the entrance to Camaran Bay is reduced to a breadth of 700 yards. There are 4 to 6 fathoms on the edge of the island reef, and in the channel 8 to 11 fathoms mud, the greatest depth being towards the cape. In Camaran Island. Inner Channel to Loheia.

approaching this entrance from the southward, pass inside the little island Rasher, keeping in about 15 fathoms along by the coast reef; keep a look-out for the sandy point of Bayath, and haul round it as requisite for the entrance. There is good anchorage in the small bay of Camaran, near the S.E. part of the island, in 7 fathoms mud, with the fort bearing S. 40° W. (*true*), distant about 200 fathoms, and the town S. 70° W. (*true*); but large vessels had better anchor outside in the extensive and remarkable fine bay formed by the island and adjacent coast before mentioned, where are regular soundings and moderate depths: here wood and water may be procured on the island. There is anchorage off the west side of the island in 4 fathoms, opposite Muckram village, known by a few date trees and a small white mosque to the south of it. The reef extends a mile off this part, with a small sandy island on it one mile N.W. of the village. Three miles N.W. of Muckram is a small sandy island, with a reef half a mile off its west side, and a little way only off the east end, and has a channel on each side of it. Four miles to the West of Muckram is a dangerous shoal, lying in a N.N.W. and S.S.E. direction, in length 4 miles, with 2 and $2\frac{1}{2}$ fathoms near its centre, and 4, 5, and 6 on each end, rocks and sand. There are 30 and 35 fathoms close to the south end of this shoal, 32 at its north end, and 35 fathoms just within it. Without the above-mentioned shoal, at the distance of 9 miles to the West of Muckram village, is a bank of rocks and sand, with 4 fathoms on its shoalest part; it is about 3 miles long, North and South, and has 30 fathoms near it on all sides. The discoloured water on these shoals may generally be seen. There is a good channel between Camaran Island and the inner shoal to the westward of it, where the breadth is about 3 miles, and between Camaran reef and the small island 3 miles to the N.W. of Muckram, $1\frac{1}{2}$ miles wide. The depths running up from the southward are 6 and 10 fathoms near the island reef and 19 in mid-channel; from thence a decrease towards the south end of the inner shoal; but proceeding to sea from the anchorage off Muckram, the depths increase gradually to the north end of the shoal, where there are 35 fathoms. In the channel between Muckram and the island to the N.W. of it, the depths are irregular, 12 and 7 fathoms in mid-channel, and 5 on either side of it; and afterwards 16 and 17 fathoms between Camaran and El Bother, next to be described. From the inner to the outer shoal, passing both from its north and south points, there is a gut of deep water, there being 35 and 40 fathoms near the western side of the inner shoal, and 22 on the eastern side of the outer one, between their south points; and between their north points, 39 fathoms near the inner and 28 near the outer. Should a vessel get between these, a course about N. by W. (*true*) for the bluff on the south part of Ockbane Island will carry her through.

*Anchorage off Camaran Town and in Camaran Bay. Anchorage off Muckram. Muckram Reef. Sandy Island. Dangerous Shoal. Bank of Rocks and Sand. Good Channel.*

EL BOTHER, about 3 miles to the north-westward of Camaran, is a low sandy island, about 3 miles in length, East and West, surrounded by a reef, which extends off the south side $1\frac{1}{2}$ miles, with 5 or 6 fathoms on its edge, rocks and sand. There is a good channel on either side of this island; that between it and Camaran is 2 and 3 miles wide, with from 10 to 23 fathoms, being bounded on the south by Camaran and the small island to the N.W. of Muckram, and on the north by the reef off the south side of El Bother. Three miles N.W. of El Bother is a patch of 7 fathoms, and $1\frac{1}{4}$ miles N.E. of its east end is a patch of 1 fathom. About 4 miles west of El Bother is the south end of OCKBANE ISLAND, which extends thence in a N.W. direction about $4\frac{1}{2}$ miles. It is low and sandy in the centre, with a hill on its N.W. end, and a bluff on the South. There are deep soundings on the East and South sides, and a reef runs along the West side about half a mile off the island, and continues round the North end, where it extends $2\frac{1}{2}$ miles off, and is steep-to, having 23 fathoms near to its West edge and 8 and 15 fathoms on the edge of the reef at the North end, decreasing towards the island. There is a good channel to the South of Ockbane and El Bother into Camaran, and there is also a channel between it and El Bother to Loheia. Any of these channels may be used by keeping a look-out for the patches, which may be seen, excepting in hazy thick weather.

*El Bother Island. Ockbane Island. Good Channel.*

CADAMON SEGGEER and CADAMON KEBEER are two low sandy islands to the E.N.E. (*true*) of Ockbane and North of El Bother. A reef extends from the latter nearly $1\frac{1}{2}$ miles W.S.W., with 5 fathoms on its end, and there is also a 3 fathoms patch about 2 miles West of the island. Three miles N.W. (*true*) of Cadamon Seggeer lies another shoal, about $2\frac{1}{4}$ miles in length, in a N.N.W. direction, having 3 fathoms rocks and sand on it, and 24 fathoms near both sides.

*Cadamons Seggeer and Kebeer Islands.*

HUMREEK ISLAND, 5 miles to the S.W. of Loheia, is about 2 miles East and West, and $1\frac{1}{2}$ miles wide. This island is low and sandy, with a fishing village on it, but no water, that article being supplied from Loheia. In the centre of the N.E. and West sides are two small white mosques, one of which is used as a mark for the anchorage at Loheia. Between the easternmost point of the island and the extensive reef off the coast the inner channel is not three-quarters of a mile broad.

*Humreek Island.*

Four and five miles S. by E. (*true*) of Humreek Island are two small shoals, called SHAB EL BUNJAM; and 9 miles south-easterly of it is another small shoal. They lie from 2 to 3 miles off the coast, and may be seen by a good look-out and passed on either side, though it would be as well to pass to the westward of them in going from Camaran Bay through the inner channel to Loheia, or the contrary.

*Shab-el-Bunjam.*

North a little westerly $3\frac{1}{2}$ miles from Humbreek, and about 7 miles West of Loheia, is the island BOWARRED, and to the westward of it four others, forming the North side of a channel from Loheia to seaward, and the contrary. These islands are GOOBAN, GOOSEE, ENTOOKFASH, and KOTAMA. Bowarred,

*Bowarred, Gooban, and Goosee Islands.*

Gooban, and Goosee, are low and small, with channels between them: that between Gooban and Goosee is very narrow, and has from 3 to 4 fathoms: between Bowarred and Gooban is a channel of 6 and 7 fathoms. ENTOOKFASH lies in an east direction, 6 miles in length, and is a low sandy plain, with a hill upon its western end, from which a reef extends 3 miles to N.N.W. (*true*) with 8 fathoms on its extremity. Antelopes are plentiful, but there is no fresh water on the island; there are two or three huts, occupied by fishermen, who are employed procuring turtle. Between this island and the small islands Gooban and Goosee, off its eastern end, there is good anchorage in 4 or 5 fathoms. The reef on the south side of Entookfash extends more than a mile off shore, and there is also a bank, with from 2 to 12 fathoms on it, and black rocks above water, from 2 to 3 miles South of the hill, and a channel between them and the island reef, and from it an outlet to the North of Kotama and reef. Entookfash Island. Good Anchorage.

KOTAMA ISLAND, in lat. 15° 41′ N., lon. 42° 21′ E., is about 21 miles to the West of Loheia, 4 to the W.S.W.(*true*) of Entookfash, and 8 miles N.N.W. of Ockbane. It is about 3 miles in length North and South, and 1½ miles (*true*) in breadth; the land upon it is rather high, and there is a hut or two, but no water nor inhabitant. There is also a small square building of coral, containing a grave. This island has a deep water channel on its eastern side, and the other sides are bordered by a bank of sand and coral of irregular soundings, from 14 to 4 and 2 fathoms near the shore on the West side, from whence it extends 2½ miles, and thence to the southward upwards of 5 miles, also with irregular soundings from 8 to 26 fathoms. This bank forms the South extremity of the outermost extensive bank on the Arabian side of the sea. Kotama Island. Deep-water channel.

LOHEIA town is built of coral, and has some large houses; it is surrounded by a wall with several forts and towers adjacent. The principal is a fort on a hill which commands the town and neighbourhood, but it is in a ruined state. The anchorage off this place is in a gut in the coast reef, which runs up to the town in a north-easterly direction, where small boats anchor. The entrance is N. 74°.E. (*true*) of the white house or mosque on Humreek Island, or the first high tower a little to the North of Loheia fort on with the northernmost of two small mounds bearing in one N. 32°E. (*true*). A ship cannot go far inside the entrance, and would then be nearly 3 miles from the town; it has also some dangerous patches, and therefore cannot be recommended for general use. Loheia.

There is an excellent bazaar in the town, generally well supplied with cattle and poultry, excepting during the Ramadan, when the market is not so well attended; flour, onions, and sweet potatoes, may be had here, but neither rice nor biscuit. The water is good, but distant from the town, from whence it is brought in jars on camels. Loheia is in latitude 15° 42′ N., and longitude 42° 44′ E.

The distant land within Loheia is high and mountainous, and seldom seen. Behind the town are a few hills, but the highest, upon which the fort stands, is not more than 150 feet above the level of the sea. Sugar Loaf is the northernmost of two small peaks to the eastward of Loheia. Jibbel Kushah is an oblong piece of land to the S.E. of Loheia, appearing somewhat like a barn. Sugar-Loaf and Jibbel Kushah.

There is a narrow rocky reef about 1¼ miles to the West of Loheia, about 2 miles in length North and South, and two rocky patches about a mile to the westward of it, with 3½ and 4 fathoms near them.

## DIRECTIONS FOR PROCEEDING FROM THE SOUTHWARD THROUGH THE CHANNEL CLOSE TO THE WEST SIDE OF CAMARAN, TOWARDS LOHEIA.

Having passed Rasher in 24 fathoms, or about 3 miles to the westward of it, steer about North, keeping about one mile from Camaran; and after passing that part of the island reef one mile westward of Muckram village (the outer part of which bears nearly South of the small island 3 miles to the N.W. (*true*) of it), steer to the north-eastward between that island and Camaran reef, where will be found 12 and 7 fathoms in mid-channel. Having passed the said small sandy island, the depths will increase to 16 and 17 fathoms in mid-channel between El Bother and Camaran Island; then, if going round the North end of Camaran, go no nearer than 14 fathoms, as 10 fathoms are near the reef which extends from it about a mile; but if going to Loheia, beware of a one fathom patch about 1¼ miles to the northward of the east end of El Bother, and steer direct for the narrow channel at the east end of Humreek Island.

## ZEBAYER ISLANDS.

JIBBEL ZEBAYER, the easternmost island, and largest of the group, is 8 miles in circumference and nearly 3 miles in length North and South; it is about 600 feet high, and has three remarkable hills, one forming a cone on its South, and another forming a barn on its North, having between them the third or centre hill, in latitude 15° 3½′ N., and longitude 42° 18′ E. From this island N. by E. ½ E. (*true*), distant 3 miles, are some low rocks awash, with breakers near them to the West, and deep water to the South and East. The second island, or Centre Peak, is about a mile in length, lying to the S.W., (*true*) of Jibbel Zebayer, having between them a channel half a mile wide, with 19 fathoms black sand in the centre. Jibbel-Zebayer. Centre Peak Island.

SABA, or the third island, lies N.W. by W. (*true*) of Jibbel Zebayer, having a channel between half a mile Saba Island.

broad, with regular soundings of 7 to 12 fathoms black sand, and no bottom at 26 fathoms at a short distance to the S.W. This island is about half a mile over, and nearly round, consisting of a sandy plain, with two remarkable hills on it: the largest, when approaching it from the eastward, appears like a barn; the other is not so high, but both have craters. To the N.N.W. (*true*) of Saba, distant $1\frac{3}{4}$ miles, are breakers, with a channel between them and the island.

Connected Island.

CONNECTED ISLAND is a most extraordinary high rugged-topped rock, to the S.W. (*true*) of Saba Island about half a mile, and connected with it by a reef, and is therefore considered as one island in numbering them.

Haycock Island. Saddle Island, Table Peak, and Rugged Island.

The fourth, or SADDLE ISLAND, the fifth, or TABLE PEAK, the sixth, or RUGGED ISLAND, and the seventh, or HAYCOCK ISLAND, are each above half a mile in length and of moderate height. Saddle Island, Table Peak, and Rugged Island, are all on one rocky bank, which extends from them one mile to S.E. (*true*), where there is a rock above water called Low Island; and one mile to the eastward of Low Island are the breakers before spoken of, $1\frac{3}{4}$ miles to the N.N.W. (*true*) of Saba. There is deep water between these breakers and Low Island, and also between them and the low rocks awash N.E. by N. (*true*) 3 miles from Jibbel Zebayer. Between Saddle Island and Table Peak there are 3 and 4 fathoms across the bank, and between Table Peak and Rugged Island there are 6, 9, and 17 fathoms, rocks and sand. N.W. by W. one mile from Saddle Island is a small rock, with deep water between it and Table Peak; and a low black island bears S.S.W. (*true*) half a mile, with 5 fathoms between it and Saddle Island. There are also 5 fathoms between Saddle Island and the rock on the extremity of the bank to the S.E. of it. QUOIN ROCK forms the northern extremity of Zebayer group; it is a conical rock or small island, bearing from Jibbel Zebayer N. 40° W. (*true*) distant 10 miles. Between it and Haycock Island no ground was found at 35 fathoms, and there is deep water close to the rock.

Quoin Rock.

Jibbel Teer.

JIBBEL TEER lies W. $\frac{1}{2}$ N. (*true*) distant 28 miles from Ockbane, and N.W. $\frac{3}{4}$ N. (*true*) 34 miles from Jibbel Zebayer, in latitude 15° 32′ 30″ N., and longitude 41° 55′ 30″ E. This island is nearly of a circular shape, being about $1\frac{3}{4}$ miles from North to South, and $1\frac{1}{2}$ miles broad, with 50 and 60 fathoms close to it. Its perpendicular height is 900 feet above the level of the sea; from the base it has a gradual ascent for half a mile, where a range of hills, about 100 yards high, commence and terminate in a steep rocky bluff on the south end of the island. From the top of this range is another gradual ascent to the peaks, which are also about 100 yards in height. The largest peak is of a brown colour, and the other forms a beautiful cone when seen from the South and West. They appear to be of volcanic origin, and smoke at the present time issues from some of the craters and bases of the peaks. There is a small sandy patch on the western side where landing may be effected, but there is no anchorage. In crossing from the reef off the north end of Ockbane for this island, 8 fathoms were found on the tail of Kotama reef; 16 miles from Ockbane, 38 fathoms; and shortly after no bottom at 150 fathoms. There are three names for this island; the Indians call it Jibbel Teer, or hill of birds; the El Shoorees of Sohar near Muscat, Jibbel Dokhan, or hill of smoke; and the Arabs and Abyssinians, Jibbel Sebain, or hill without anchorage.

## THE COAST OF YEMBO, FROM LOHEIA TO RAS TOORFAH, WITH THE ISLANDS ON THE OUTER REEF, FORMING WITH THE COAST THE INNER CHANNEL, AND OTHERS ACROSS THE OUTER REEF, WITH ANCHORAGES, TO 17° 14′ OF NORTH LATITUDE.

Ras Mussahrib. Ras Shamah. Gurnah-Shurnah. Gheesan Town.

From Loheia the coast turns N.E. by N. (*true*) about 9 miles, forming a slight bay between; it then turns to the North 8 leagues to RAS MUSSAHRIB, in lat. 16° 14′ N., and lon. 42° $47\frac{1}{2}$′ E., forming a slight curve inward; the whole space being bordered by a reef somewhat less than a mile in breadth, excepting in the vicinity of the Ras, where a shoal patch extends 2 miles off. From Ras Mussahrib the coast bends about N. by W. $\frac{1}{2}$ W. a distance of 40 miles, forming a bight with sinuosities to RAS SHAMAH, a projecting point, in lat. 16° 52′ N., lon. 42° 34′ E., 3 miles S.E. of which is GURNAH SHURNAH, a bushy point, the reef bordering the shore all the way to the latter place, about half a mile wide. The coast nearly the whole space from Loheia is covered with jungle, without village, hut, or inhabitant. The town of GHEESAN is to the northward of Ras Shamah, and has a few square stone buildings, but the principal part of it consists of grass huts, which are mostly round, with pyramidal tops. It has a large fort, greatly decayed, and there is a small bazaar, scantily supplied with such dry provisions as the natives use, but none for ships. Water is very scarce. The population of Gheesan is about 400, employed chiefly in the pearl fishery, &c. on the banks in its neighbourhood. The anchorage is in 7 fathoms about 2 miles off shore, with the fort bearing N. 76° E. (*true*). There is a sunken sandy patch of 2 fathoms in the line of 6 fathoms soundings $1\frac{1}{4}$ miles to the S.W. (*true*) of the rocky point of the land, that is, about half a mile South of the town. The fort bears about N. 35° E (*true*) from this patch, distant about $1\frac{1}{2}$ miles, and a small white mosque in the town is in line with a remarkable rock on a hill behind it. The shore reef projects considerably about Gheesan, and the soundings are irregular inside the depth of 7 and 6 fathoms; but there is a place in $3\frac{1}{2}$ and 4 fathoms about a mile off shore, at a short distance from a rocky spot, forming an inner anchorage for small boats off the town. The *Palinurus* anchored in $4\frac{1}{2}$ fathoms

Gheesan Anchorage.

sand off the town, the fort bearing E.N.E. $\frac{1}{2}$ E., and Ras Shamah S. 30° E. (*true*). Gheesan hills cannot be mistaken; they are close behind the town, and have no other high land near them.

Eight miles N.W. $\frac{1}{2}$ W. (*true*) from Ras Shamah is the East end of FERAFER ISLAND, which is $2\frac{1}{2}$ miles in length W.N.W., narrow, low, and sandy. CORE ABOO-SABAH is a bight or arm of the sea, about 14 miles deep, running into the coast North of Ferafer Island: the inner and eastern part of it is shallow, but in the southern and western part is good anchorage of 6 and 7 fathoms, formed by a narrow neck of land, the South part of which is called RAS TOORFAH. This Ras, or cape, extends within a mile, or little more, of the west part of Ferafer Island, having a good channel of 8 and 10 fathoms between. A little way North, within the Ras, is a small island, to the southward of which is 6 fathoms water, in a small bight for boats. To the E.N.E. of Ferafer Island the coast forms another bight, called GURNAH-WATAH, with a depth of 6 to 8 fathoms in the outer part of it. Ferafer Island. Core-Aboo-sabah. Good Anchorage. Ras Toorfah. Gornah-Watah.

RAS TOORFAH is in lat. 16° $59\frac{1}{2}'$ N., and lon. 42° $23\frac{1}{2}'$ E. The coast from thence runs nearly North a distance of 27 miles to Shab el Aboo Looker, where it forms a small bight, 7 miles South of which is Shab el Kebbeer. Here the coast reef extends nearly 2 miles from shore, decreasing in breadth both to the North and South; but from Ras Toorfah 15 miles northward there is no coast reef. Shab-el-Aboo Looker. Shab el Kebbeer.

Having described the coast, we shall return to the southward, and commence with

HAMMAR ISLAND, about 4 miles N.W. (*true*) of Loheia, is low, about $2\frac{1}{2}$ miles in length N.E. and S.W., and three-quarters of a mile wide, having a fishing-hut or two on its western side. There is a small bight in the reef off its N.E. part, affording anchorage for small boats. There is little reef on the east and west sides, but it extends off the S.W. part nearly a mile towards the eastern part of Bowarred Island; therefore, when passing between it and Bowarred, keep nearest to the latter island. Firewood may be had for cutting on Hammar, but no water. Hammar Island.

West from Hammar 9 miles, and about 3 miles North of the centre of Entookfash, is the low sandy island TULLOWAIN, with a little rise on the eastern part, and surrounded by a reef extending from it nearly a mile. Tullowain Island.

North-eastward 6 miles from Hammar is a small island near the coast reef, and North of it one mile is a rocky patch. Another rocky patch lies $3\frac{1}{2}$ miles East of Hammar.

Five miles N.W. $\frac{1}{2}$ W. (*true*) of Hammar Island is the low sandy island DORAMA, and nearly 3 miles N.N.E. (*true*) from it is ADJUAH ISLAND, its south end being the highest part; and $3\frac{1}{2}$ miles further N. by E. (*true*) is ZOORBAT ISLAND, upwards of a mile in length, and very narrow. These three islands are on the eastern edge of a narrow shoal bank, with 4 or 5 fathoms close to the eastward of it. Dorama, Adjuah, and Zoorbat Islands.

E. by S. of Zoorbat, about $3\frac{1}{2}$ miles, is a small sand-bank or island, called DYER ISLAND, and to the S.S.E. of it are two others of the same description, occupying a space of 2 or 3 miles, and each of them surrounded by a reef. There is a narrow passage of 6 or 7 fathoms between Dyer Island and the other two, but it is best to pass either to the East or West of them. Dyer Island.

At 6 miles to S.W. (*true*) of Zoorbat, and to the West of Adjuah, are the two BEREE ISLANDS, small and low, with a fisherman's hut on the North end of the inner one; they are surrounded by reefs, and have 17 fathoms between them. Beree Islands.

North-easterly 3 and $4\frac{1}{2}$ miles from Zoorbat Island are the islands JUREB and RUCKLE, two low sandy spots, with reefs off them, extending 1 mile to the westward; and 1 mile S.W. of Jurab is a small rocky patch. To the N.W. of Ruckle, about $2\frac{1}{2}$ and 3 miles, are the low sandy islands ZUDGE and ZOHA, situated on an extensive bank of irregular soundings; 1 mile to the North of Zudge is a 2 fathoms patch, and $3\frac{1}{2}$ miles in the same direction from it is an extensive 1 fathom bank. SHAB NUSSEEB is a shoal about 2 miles long, nearly dry in some parts, and has a small patch above water about 2 miles East of Jurab. Jurab and Ruckle Islands. Zudge and Zoha Islands. Shab-Nusseeb.

BAACE is a small island, situate on the South end of the innermost part of the Outer Reef, and has a patch of 1 fathom half a mile South of it, and also a patch 2 miles W.N.W. (*true*) from it, on a point of the reef about 3 miles East from Zudge; S.W. (*true*) of the last-mentioned patch about half a mile is another, having a channel of 13 fathoms between them. Baace is about 5 miles off the coast reef, which is here the breadth of the Inner Channel, with a depth of 5 to 12 fathoms. From Baace the inner edge of the Outer Reef runs about 14 miles North a little westerly to a point on which there are 5 fathoms about $4\frac{1}{2}$ miles off Ras Mussahrib, but the channel is only $2\frac{1}{2}$ miles wide between it and the reef that extends about 2 miles off the Ras. Baace Island.

N. by W. (*true*) of Baace, distant $6\frac{1}{2}$ and $8\frac{1}{2}$ miles, are the islands ABOO-SHEDGER and GORAB, and about 2 miles S.W. of the latter is ABOO SHAD. GUTHERBAN and HAWROOF are two small islands, lying a little to the North of Baace. All these are low sandy islands, situated on the inner part of the Outer Reef, between which, and also to the northward of them, are many dangerous patches, rendering it unsafe to attempt to pass over the reef in this neighbourhood. Aboo-Shedger, Gorab, Gutherban, and Hawroof Islands.

LOBAN ISLAND lies North, at the distance of 10 miles from Kotama Island before described, in lat. 15° 52′ N., lon. 42° 21′ E. This island is composed of coral rock with a layer of soft earth and sand on the top; Loban Island.

it is low and of inconsiderable dimensions, the water having made passages through the lowest part, and part of the sides are broken down. The reef upon which it is situated extends a quarter of a mile off the North end, and nearly 2 miles from the South end, with 18 fathoms close to. South of the island $4\frac{1}{2}$ miles is the North end of a shoal, with 8 fathoms on it, from whence it extends southward. There are 25 and 30 fathoms between.

Toag Island.

TOAG ISLAND lies about N. $\frac{3}{4}$ E. (*true*), distant $9\frac{1}{2}$ miles from Gorab Island and 4 miles from the coast reef, with deep water all round it, and may be passed on either side; it is about 4 miles North of the North point of the reef before mentioned, $4\frac{1}{2}$ miles to the westward of Ras Mussahrib.

Ashig Island.

About N.N.W. (*true*) 4 miles from Toag is ASHIG ISLAND, with two others lying in the same direction at three-quarters and 2 miles from it. These islands are on a narrow bank, which extends about 7 miles N. by W. (*true*) of Ashig, and $1\frac{1}{2}$ miles to the South of it, the North part having from 2 to 5 fathoms on it. Between this bank and the coast reef the channel is from 4 to 5 miles wide, with 8 to 10 or 12 fathoms in it, but, like Toag, it may be passed on either side.

Dahret-Jaffree Island. Jaffree and Guthier Islands.

About N. by W. (*true*) 12 miles from the north end of the last-mentioned bank is the little island DAHRET JAFFREE, with 10 fathoms all round it, and 2 or 3 miles to the N.W. (*true*) of it, the islands JAFFREE and GUTHIER, situate on a bank, with 2 fathoms between them. These are also about 5 miles from the coast reef, and may be passed on either side, there being 10 fathoms within, and 25 to 30 on their outside.

The inner edge of the Outer Reef, from abreast of Ras Mussahrib, forms a bight with deep water to the S.W. and then extends North to lat. 16° 23′ N. It thence turns to the westward very irregularly 13 miles, and then to the southward in the same irregular manner to the parallel of 15° 52′ N., thence E. and N.E. (*true*) to Baace Island, having several islands and patches on it, but no clear channel. Of these islands the first is OMEL HAMMATH, at the distance of $5\frac{1}{2}$ miles W. by S. (*true*) of Toag, and about $1\frac{1}{2}$ miles on the Outer Reef. It is a small coral island, with another small island North of it, a patch $1\frac{1}{2}$ miles to the East, and another to the N. E.

Omel-Hammath Island. El Bother Rock. Tokaillah Islands.

EL BOTHER is a high remarkable rock, about 5 miles S.W. (*true*) of Omel Hammath, with five small rocky islands from North to West. TOKAILLAH ISLANDS are two in number, which are also high and rocky, situated to the N.W. (*true*) of El Bother; the smaller, distant 1 mile from it, is of triangular shape, and nearly $1\frac{1}{2}$ miles long and three-quarters of a mile in the broadest part. The larger island is more of a horse-shoe shape, and upwards of 5 miles in circumference; it has a small village, a mosque, and some wells of brackish water.

Gibel-Jing and Muffiagane Islands. Fusht Island.

GIBEL JING and MUFFIAGANE are two small, high, and rocky islands, S.W. (*true*) of Tokaillah Islands, situated on a bank of shallow water. The Island of FUSHT lies to the S.W. (*true*) of these, in lat. 16° 11′ North, and lon. 42° 25′ E.: it is $2\frac{1}{2}$ miles in length and 1 in breadth at the south end, and is of good height. There is a small fishing village, with a mosque in the centre of it, and near the village are some wells of brackish water. On the south part of the island is a well of good water, but it is difficult to be obtained, the landing place being rocky.

Sana Island. Mugdgoor Island.

About 7 miles W.S.W. (*true*) of Fusht is SANA ISLAND, situated on an extreme point of the reef, in lat. 16° 7′ N., lon. 42° 19′ E.; it is about $1\frac{1}{2}$ miles in length N.W. and S.E., with two bights on its N.E. side. There are 3 fathoms close to its North end, and 53 fathoms very near to its West side. About $7\frac{1}{2}$ miles E.S.E. from Sana, and $5\frac{1}{2}$ miles S.S.E. (*true*) from Fusht, is MUGDGOOR ISLAND, also about $1\frac{1}{2}$ miles in length, with 3 fathoms close to its N.E. side, and between these, but nearest to Fusht, are two small islands. Nearly 8 miles S.S.E. $\frac{1}{2}$ E. (*true*) from Sana in the parallel of 16° North latitude, and near the western edge of the reef, is the west end of a shallow bank of 1 to 3 fathoms, which extends about $3\frac{1}{2}$ East. There are 4 fathoms close to the northward of it, 20 fathoms close to the westward, and about a mile further West, 55 fathoms. To the N.W. (*true*) of Fusht are the Islands of Erthane, Zinier, Beree, and Rafer Beree, which are situated upon the centre of the banks, with very irregular soundings, and in some places only 2 fathoms. ERTHANE is long and narrow, and rather high, 4 miles West of Tokaillah. ZINIER Island is of a triangular shape, about 8 miles in circumference; and about 1 mile North of it is an island about 1 mile in extent. Between Zinier and Erthane is another small island. On the west side of Zinier is a small village and some brackish water. Antelopes are plentiful. The bank on which these four islands are situated is very shallow; there are from 3 to 15 fathoms between it and Tokaillah, 13 fathoms to the northward, 4 to the westward, and 58 fathoms close to the southward of it.

Erthane and Zinier Island.

Rockgadah and El Onserat Islands.

N.W. by W. (*true*), distant 5 miles from Omel Hammath Island, is the Island ROCKGADAH, with two small islands South of it, one distant half a mile, the other 2 miles. West of Rockgadah, distant $3\frac{1}{2}$ miles, is El Onserat Island, about $1\frac{1}{2}$ miles in length, and of an extraordinary shape; and to the W.N.W. (*true*), upwards of a mile, is a sand-bank $1\frac{1}{2}$ miles in length East and West; this is near the north part of the inner bank. A small island lies $2\frac{1}{2}$ miles S.E. of El Onserat.

Sale Seeah Island.

Nearly North, $3\frac{1}{2}$ miles from Rockgadah, is the Island SALE SEEAH or OMEL HUSSEL, a small low sandy island, surrounded by a reef, with from 2 to 9 fathoms on it, about $1\frac{1}{4}$ miles wide: it extends $2\frac{1}{2}$ miles to the northward of the island, and 1 mile to the South; and the whole is surrounded by a channel of deep water of from 25 to 12 fathoms.

Sale Rubbah Island.

SALE RUBBAH ISLAND lies $8\frac{1}{2}$ miles W. by S. (*true*) from Sale Seeah, and nearly $1\frac{1}{2}$ miles North of the

island before mentioned, North of Zinder: it is about a mile in length East and West, and between it and the sand-bank is a gut of deep water on the outer bank, having from 27 to 35 fathoms mud.

North, distant 7 miles from Sale Seeah, is the South end of a one-fathom patch, which extends about 4 miles northward, about a mile wide, with 22 to 27 close to it. One-fathom patch.

DODUFFER and the ZOORATS are situated upon a bank of sand and coral soundings, shaped like a man's leg and foot, 3 miles to the westward of Sale Seeah Island. The depth between the two Zoorat Islands is from 2 to 4 fathoms, and to the northward of them, from 6 to 13 fathoms. Just outside the calf of the leg are three rocky patches, and between them and the reef North of Sale Seeah is also a rocky patch. There is a deep channel on either side of this leg-bank, and the western one is bounded by an extensive bank, which runs down towards Sale Rubbah, leaving a channel between its south point and that island leading to the westward. Doduffer and Zoorat Islands.

To the westward of the reef on which Zinier Island is situated, about 1½ miles, is another reef, with 4 to 20 fathoms between. This reef is about 9 miles in length, N.E. by N. and S.W. by S., somewhat in the shape of a pear, having on it 3 islands and some rocks, with some very shoal water. The westernmost of the islands is RAFER BEREE, about 2½ miles in length N. by E. and S. by W., of irregular shape, and about a mile broad. About 1½ miles East of it is BEREE ISLAND, of similar length and breadth, with a small island and some rocks between their south ends. At the N.E. end of the bank, and 3¼ miles from Beree, is MARAN ISLAND, surrounded by a reef, and 20 fathoms to the southward of it. About 2 miles N.W. by N. from Maran is the Island REMAIN, also surrounded by a reef, with 8 fathoms between them. Remain is about 1½ miles in length and shaped like a hatchet with the haft to the N.W., the extremity of which is the highest part: the island is principally composed of sand. Five miles north of Remain is SIMER ISLAND, small, low, and sandy, with a reef on its north side; and 2 miles South of Simer is a rocky patch. Rafer-Beree and Beree Islands. Maran and Remain Islands. Simer Island.

DAHRET SIMER is a low sand and coral island, about a mile in length, surrounded by a reef, which extends 1½ miles S.E. (*true*) from it, with 1 fathom on it. It is nearly S.E. by E. (*true*), distant 2½ miles from Simer, and N.E. by N., 4½ miles from Remain Island, and is situated on the west edge of the bank before spoken of, whose south edge is within a mile of Sale Rubbah Island, from whence it extends 17 miles N. by E., and is 5 to 6 miles broad, but there is no passage across it to the southward of Muzzaguf Island, about to be described. N. by E. ½ E. (*true*), 3½ miles from Dahret Zimer, is a cluster of rocks, about a mile in extent, with 7 to 10 fathoms on its south and west sides, and to the N.E. of which from 1 to 3 miles are 4 small islands, with a larger one to the eastward of them, called MUZZAGUF, about a mile in length and half a mile in breadth. To the westward of these islands is a channel in a N.N.E. direction, with 7 fathoms in it. Muzzaguf and the 4 small islands are situated on a shallow reef. N.N.E. (*true*), 4 miles from Muzzaguf, is the south end of a shallow patch, (*true*), extending northward more than a mile to near the end of the bank. The inner edge of this bank is 16 to 19 miles from the main, and there are from 13 to 30 fathoms near it. Dahret-Simer Island. Muzzaguf Island.

About N. by W., distant 12 miles from the north end of the reef of Ashig Island, is the little island DAHRET JAFFREE, and W.N.W. of it, 1 mile, is JAFFREE ISLAND; N.N.E. from which, 1 mile, is GUTHIER. These three little islands are on the western side of the inner channel, distant 5 miles from the shore reef, having soundings of 12, 8, 4, and 2 fathoms between. The two latter are situated upon one bank, upwards of 2 miles North and South, and 1½ miles wide, with 2 to 3 fathoms between them. Dahret Jaffree is surrounded by a separate reef, and there are 10 fathoms between it and the others. Dahret-Jaffree, Jaffree and Guthier Islands.

Eight miles N.W. ¾ W. (*true*) from Guthier is AMNAH ISLAND, with a small island to the southward of it, and a rock about a mile East of its north end. From 1 to 2 miles North of Amnah is a cluster of five islands, the north-westernmost called OMEL CURRA, and the north-easternmost OMEL CURRIP: these 5 islands are situated upon a sand and coral bank and there is a passage between them and the southern two, with 9 to 13 fathoms depth. N. 28° W. (*true*) of Omel Curra, upwards of a mile, there is a one-fathom patch; and there is a sunken patch at the same distance S.W. of the island. Two miles and a half East, northerly from the little island South of Amnah, is a patch of 5 fathoms. N.N.W. ½ W. (*true*), distant 3 miles from Omel Curra, is JESEERAT HUBBER ISLAND, about half a mile square, and surrounded by a reef, The narrowest part of the inner channel between Omel Currip and the shore reef off Gheesan is 4 miles wide, with 9 to 14 fathoms, and between Jeseerat Hubber and a three-fathoms patch N.E. of it, it is 3½ miles wide. Jeseerat Hubber is about 7½ miles west of Gheesan. Amnah-Omel, Curra, and Omel-Currip Islands. Jeseerat Hubber.

About 5 miles West of Jeseerat Hubber is the east edge of a triangular-formed bank, about 6½ miles North and South, having 6 islands on it. On the south point is SALE SHERTEF, about half a mile long; and 1¼ miles N.E. (*true*) of it is DORAKER ISLAND, with 30 fathoms near its S.E. side. ABOO SHOOGAR is near its N.E. end, and has 24 fathoms near its east side. This is a very small island, composed of madripore, cracked and broken into numerous pieces, forming deep clefts, through some of which the water passes, while others are filled with sand and earth, where some jungle trees have sprung up. The bank from thence extends about 5 miles westward, with 16 fathoms on its extremity, but on some parts it is very shallow. The other three islands lie to the N.N.W. (*true*) of Sale Shertef. About 2 miles E.N.E. of Aboo Shoogar is a patch of 13 fathoms, and 30 fathoms to the eastward of it. Sale-Shertef, Doraker, and Aboo-Shoogar Islands.

Shoorah Island and bank.

N.W. by N. (*true*), distant 11 miles from Jeseerat Hubber and 2½ miles to the westward of Ras Toorfah, is SHOORAH ISLAND, which forms the extent of this part of the inner channel, with regular decreasing soundings from the island to the Ras, near which are 7 fathoms. Shoorah is a small and low island, situated upon the eastern end of a bank of rocks and sand, extending to W.N.W. nearly 7 miles, with soundings of 2 to 12 fathoms on it. This bank lies in a direction with GORAB BANK, and between them there is a channel of deep water 3 miles wide. GORAB ISLAND lies W.N.W. ½ W. (*true*), distant 13½ miles from Shoorah, and near the west end of the bank just mentioned; it is rather high, and little more than half a mile in length, with a small black rock off its north end. Gorab Bank is about 5 miles long and 3 broad, with irregular soundings of 9 to 20 fathoms, on rocks and sand.

Gorab Bank and Island.

Theran Island.

THERAN ISLAND is 9½ miles N.N.W. ½ W. (*true*) from Shoorah, at 7 miles off the coast, and is on the west side of the Inner Channel. The highest part forms a steep bluff to the westward, which is 60 feet above the level of the sea, and has 25 fathoms pretty close to it; a small bank extends off the north side of the island, with bad holding ground. This island lies E.N.E. (*true*) 9½ miles from Gorab, and there is a good deep channel between it and Gorab Bank.

Farsan Islands.

THE FARSAN ISLANDS are the largest all along this coast, and are situated upon the extensive banks west of Gheesan. They are two in number, but may be considered as forming one island, being connected by a sandy spit of shoal water, across which camels frequently pass from one to the other. On the east side of this spit is CORE HASSIEFF, and on the west side, CORE BUCKARRAH. They are of very irregular shape, and will be better understood by the chart than by any written description. The westernmost is FARSAN KEBEER, 31 miles in length N.W. ¾ W., extending from lat. 16° 35′ N., lon. 42° 13′ E., to lat. 16° 54′ N., lon. 41° 47′ E. FARSAN SEGGEER is on its N.E. side, 18 miles in length, and extends to lat. 17° 1′ ½ N. Although their whole breadth is only 12 miles' they measure round their edges 130 miles. The S.E. point lies 26 miles S.W. ½ W. (*true*) from Gheesan, and N.W. by N. (*true*) 6½ miles from Simer Island, before described.

Description of marks, anchorages, and land of Farsan. Jibbel-Cassar, Jibbel-Marabah, and Jibbel Munthak. Jibbel-Momed. Jibbel-Deesan. Jibbel-Suffer. Remarkable Bluff.

The land of Farsan is of considerable height, interspersed with some plains and valleys. The hilly parts are coral rock, the most remarkable of which is Jibbel Cassar, a small round hill, East of Tibtah Bay; Jibbel Marabah, a table hummock, on an island near Farsan, about 5 miles N.E. (*true*) of Tibtah Bay. Jibbel Munthak, 11 miles N.W. (*true*) of the last-mentioned, is a high island, lying in an East and West direction, having on its North side the entrance to Core Suggeed. Jibbel Momed is a high hill, like a quoin, on the easternmost point of an island of that name, off the northern part of Farsan: Jibbel Deesan, a high hummock on the south part of an island of the same name, off the N.W. part of Farsan Kebeer, and forms the S.W. side of the entrance to Core Buckarrah. Jibbel Suffer is an elevated part of the island to the northward, with a tree on its top, and is to the south-westward of Sale Abado Island. Remarkable Bluff is of quoin-shape on some bearings, and from the southward appears like a hummock with a peak in the centre; it is situated on the western part of the south end of the island, on the east side of the eastern entrance to Goomah Bay; there are also three remarkable trees two miles South of Jibbel Cassar.

Channel near the east end of Farsan-Kebeer.

About midway between the S.E. point of the Farsan Kebeer and Marabath Island, and near to Farsan, is the island GOMARREE, situated on the west side of a channel, through which vessels may pass from Gheesan to the south-westward and contrary. Half a mile East of Gomarree is a two-fathoms patch, and further eastward are three other patches in the entrance of the channel, which, throughout, is about 2 miles wide. The shoals are numerous in this neighbourhood and about Farsan Island, and the eye must be the principal guide to a vessel entering either way. The surveyors seldom had much difficulty in seeing the reefs.

Vessels having occasion to enter this channel from the south-westward must avoid a bank that extends to the South of the S.E. point of Farsan Kebeer 2½ miles, which from thence turns round to N.E., with 3 to 2 fathoms on it; and also of the little island Hindeah, to the East of this bank, and 3 miles S.E. by E. ½ E. (*true*) from the S.E. point of Farsan. One mile S. by E. (*true*) of Hindeah is a small island, surrounded by a shoal, and S.E. (*true*) of it 1 mile is a patch of 1 to 5 fathoms.

Coolam Island.

Due East from the S.E. point of Farsan, rather more than 3 miles, is the island COOLAM, with several small islands and rocks to the South, West, and North, at 1½, 2, and 3 miles' distance, on a bank that forms the east and south sides of the above channel. Off the bank, due West of the south end of Coolam, is a rocky patch in the channel, having 10 fathoms between it and the bank, and 15 fathoms on its western edge.

Haffer Island.

To the N.E. (*true*) of Goomaree is HAFFER, a small rocky island, and a cluster of small rocky islands on the edge of the rocky bank, which extends about 5 miles to the East of Farsan, and forms the north side of the channel eastward just mentioned. The northernmost of this cluster is called ABOO SHOORY Island, and about half a mile to the N.E. of it is a bank of rocks and sand, with 3 to 15 fathoms on it; and between the south end of this bank and Aboo Shoory, there is no ground at 40 fathoms. The bank extends nearly 4 miles N.E. and is 1½ miles wide.

Aboo-Shoory Island.

Jibbel-Marabah Island.

JIBBEL MARABAH ISLAND lies to the northward of Haffer, and near a projecting point of Farsan Kebeer; it is about half a mile long, composed of rocks, and is the highest island in this neighbourhood. It

has a flat top or hummock of the barn shape, is surrounded by a group of small low islands, and appears from the northward as if part of Farsan Island.

JIBBEL ABDOOLAD is a small rocky island to the North of Marabah, and is also surrounded by a group of smaller islands; it may easily be distinguished by a knob or remarkable bluff on its south end. This island and group are situated upon a bank off the Farsan coast, which extends from Marabah, and forms a tongue or point, 3 or 4 miles northward of Abdoolad Island, having between it and Farsan a bight of deep soundings. Jibbel Abdoolad Island.

MUNTHAK ISLAND, mentioned above, in lat. 16° 49′ North, is about 3 miles in length, East and West, and 1 mile broad at the east end, tapering to the West, where it is only half a mile broad; it is high, and composed of coral. To the South of Munthak is CORE HASSIEFF, running about 8 miles into Farsan Kebeer; it has from 5 to 8 fathoms depth, but is narrow and full of shoal patches; there are also some rocky islands on the west side of it, and two small rocky islands 1½ miles east of Munthak Island, which forms the east side of the entrance. A dangerous rocky spit runs nearly 3 miles to the North of these islands, being the extremity of the reefs on the north part of Farsan Kebeer. Munthak Island. Core Hassieff.

CORE SUGGEED is to the west of Munthak Island. This is an excellent harbour, of more than a mile extent, with 9 to 12 fathoms. Here is a small village and a grove of date trees on its north side, in which are many wells of good water. The houses are small and built of coral, and are mostly in ruins; and there are no supplies to be obtained besides water. The anchorage is defended from all winds and sea; the entrance to it is a quarter of a mile broad, bounded on the South by Munthak Island, and on the North by five small islands, off the westernmost of which there is a rocky spit, extending to the S.W. half a mile into the bay, which must be avoided. Core Suggeed.

There are some dangerous patches East, E.N.E., and N.E. (*true*) of Munthak Island, distant from 3½ to 4 miles, forming a rocky spit. A line from Dthabuck Island to the highest part of Munthak, or Munthak bearing S. 42° W. (*true*) will clear them. The northernmost of the islands forming the entrance to Core Seggeer, bears S. 78° W. (*true*) from the point of the spit. Having entered the bay and cleared the spit running off the westernmost island steer up to the N.W., and anchor off the grove of trees, in 12 fathoms mud.

N.E. (*true*), distant 5 miles from the N.E. point of Munthak Island, is the island DTHABUCK; and S.E., 1 mile from it, is a patch of 2 fathoms: W.S.W. (*true*), 2½ and 3 miles from this island, are too rocky patches. Dthabuck Island.

N.W. ¾ N. 7 miles from Dthabuck and S.S.W. (*true*) from Gorab, distant 6 miles, is the little island SALE ABADO. Dthabuck and Sale Abado are small coral rocks, of a round shape, and from 10 to 15 or 20 feet high, spreading out at the top with a sharp circumference, and falling in considerably towards the base. They are called by some Pie Islands. A bank extends from Farsan Seggeed to the eastward of Sale Abado, consisting of shoal water and groups cf small rocky islands. JESEERAT HACKBANE, the northernmost and largest of these islands, is 7 miles to the N.W. (*true*) of Sale Abado, and 7½ miles West of Gorab Island. It forms a narrow stripe half a mile broad and 2 miles long, with two small islands off its north end. The bank extends 7 or 8 miles to the N.W. of it, with shallow irregular soundings. Between Jeseerat Hackbane and Gorab is a channel of deep water, 4 miles broad. Sale Abado Island. Jeseerat Hackbane Island.

RAS RUSSEEB, the North point of Farsan Seggeer, is in lat. 17° 1½′ N., lon. 41° 53′ E. W.N.W. (*true*) from Ras Russeeb, distant 4½ miles, is the East end of JIBBEL MOMED Island, which is 2 miles long and 1 mile broad; the eastern part forms a high quoin-shaped hill, the other parts low ground of sand and coral. The island is nearly surrounded by a gut of deep water, of 15 to 20 fathoms mud. A bank runs off its North end, with 3 to 8 fathoms on it, and at 3½ miles North of the eastern part of the island there is a patch of 2 fathoms. Ras Russeeb. Jibbel Momed Island.

KHYNAH ISLAND is 5½ miles W.S.W. ½ W. (*true*) of Jibbel Momed; it is a low triangular island of sand and coral, 1 mile broad, surrounded by five small islands, two of which are off its north end, and on the West a larger one; one on the S.W. and one on the S.E. They are all surrounded by a coral reef, which is connected with the bank that runs to the westward, from the north end of Farsan Seggeer. Khynah Island.

N. by W. (*true*), 8 miles from Khynah, is the small rocky island MUTTERHANE; and N. and N. by W., 7 and 8 miles from Jibbel Momed, are four shallow rocky patches, with 11 and 18 fathoms near them. Between these patches and Mutterhane is a bank of irregular soundings, 3½ miles wide, stretching 3 or 4 miles northward, with 35 and 40 fathoms near its edges. W.N.W. ½ W. (*true*), 5½ miles from Khynah, is a small rocky island, with a reef round it, called DAHRET MUTTERHANE, and to the North of it, 2½ miles, is a rocky bank of 20 to 25 fathoms, and no bottom at 40 and 60 fathoms near it. Mutterhane and Dahret Mutterhane Islands.

S.S.E. (*true*), about 3 miles from Khynah, is the north point of JESEERAT DEESAN ISLAND, whose western edge extends 4½ miles southward; it is of triangular form, nearly 15 miles in circumference, and is generally flat near the sea, rising gradually towards the centre, having at its south part a remarkably high hill. The S.E. part of Jeseerat Deesan is connected, by a bank of shallow soundings, with the N.W. point of Farsan Jeseerat Deesan Island.

Kebeer, and there are two small rocky islands between them, and a larger on the S.E. part of Deesan, with a small boat's channel to the westward of it. The banks off the east side have some dangerous rocks, but the other sides have deep water. A small island lies off its north end, with deep water between them. On the south side of the island are the remains of a village, consisting of about one hundred houses, built of rough stones without cement, and near it a cemetery, containing about one thousand Mussulman graves, and a tomb, enclosed by a wall. This place is said to have been inhabited fifty years ago. Neither wood nor water were found.

Triangular Island.

S.W., 3 miles from Ras Russeeb, and 4 miles S.S.E. (*true*) from Jibbel Momed, is a triangular island, 5 or 6 miles in circumference, on the South edge of the bank that extends westward from Ras Russeeb to Khynah Island, having 16 fathoms to the southward of it; and about mid-way between this island and Jibbel Momed is an island, about a mile in length, and three small ones due west of it, all low coral islands. On the south edge of this bank, and 4 miles to the westward of the Triangular Island, is a patch of one fathom. It is about 2½ miles from the N.E. side of Jeseerat Deesan, and there is deep water close to the southward of it.

Core Buckarrah.

Five miles East of Ras Farsan Kebeer is the N.W. part of Farsan Seggeed, where there is a small village, called KEFTIB, on the highest part of the land. Between these is the entrance to CORE BUCKARRAH, formed by the Farsan Islands, and runs in to the S.E. about 14 miles. The outer entrance is between Khynah Island and Jeseerat Deesan. There are irregular soundings of 4 to 8 fathoms in the innermost half, and the outer part has deep water. It is not advisable for ships to run entirely up, as some parts of it are so narrow that they would have to warp a considerable way out against a north-westerly wind. The bank which connects Jeseerat Deesan with Ras Farsan extends 4 or 5 miles within the Ras, on the edge of which a ship may anchor in 16 to 18 to 20 fathoms, 1½ or 2 miles eastward of the Ras. At 2½ miles eastward of the Ras, and on the edge of the bank, is a small patch, with three feet water on it; and about 4½ miles S.E. of the Ras, is the village of SAYEL. There are two or three wells of very good water just within the narrowest part of the Core, close to the beach, on the western side. The N.W. part of Farsan Kebeer is high and rocky.

Anchorage.

Sayel village. Fresh water.

Sarso and Sinde Sarso Islands.

S.W. by S. (*true*) distant 8 miles from Khynah, is the north end of SARSO ISLAND, extending thence about 5 miles to the S.E.; and to the eastward, and parallel to it, another island, called Sinde Sarso; they are two narrow coral islands, about a ½ and ¼ of a mile broad, and both of considerable height, the outer one being 160 feet about the level of the sea, with sharp points of coral above the surface. The channel between them has from 14 to 20 fathoms in the middle, but is narrow and blocked up at the S.E. end by small islands and shoal water. It affords good protection from southerly winds, but it is not advisable to anchor in it with northerly winds, as there would be some difficulty in getting out. These islands are situated on the eastern verge of extensive shoal water, called Shaab Farsan, which extends about 10 miles to the westward, and 18 miles to the N.W.

Button Rock.

There is a small rocky islet close to the West of Sarso, about a mile from its N.W. point, which, from its singular appearance, is called CAPE ISLAND, or BUTTON ROCK, appearing like a button standing on its shank.

Umal Bisran Island.

Shoal Bank.

E. by S. about 6 miles from Sarso, is the island UMAL BISRAN, about 5 miles round, rather high, with a valley in the centre, into which the salt water flows; it abounds with wood, but there is no fresh water. It is about a mile distant from Farsan Kebeer, and N.W. of it, from 1½ to 2½ miles, is a bank with 1 to 2 fathoms water on it.

Zelfeef Island and Bank.

Nearly 3 miles South of Umal Bisran is the north part of ZELFEEF ISLAND, of about 7½ miles in length and 2 miles broad; the land is high, and a small cove runs up into the N.W. part of the island, from which fresh water may be procured, but with some difficulty; wood may also be cut here, and antelopes are to be found. Zelfeef is situated on the same bank with Umal Bisran and the shoal North of it, which bank extends to the S.E., and includes Doomsook and Goomah Islands, hereafter described. There is a deep channel between this bank and Farsan, from 3 to 4 miles wide, and also a deep channel between it and the outer bank or reef, called Shab Farsan. To the S.W. (*true*) of Zelfeef, on the reef, is a chain of low sandy islands in a S.E. direction, with very shallow water about them.

Low sandy Islands.

Selwan Island.

Goomah Island.

S.E. (*true*) from Zelfeef 1½ miles, and on the inner edge of the same bank, is the island SELWAN, about 2 miles in length, high, and of coral formation, having shallow water on the S.W. and deep on the N.E. side. E. by S. 7½ miles from Selwan, is the island GOOMAH, having three high coral islands between, and on the same bank. Goomah Island is of circular shape and 9 miles round, with a deep gut or small core on its South side, and a rocky spit extending nearly a mile off its north end, with 9 fathoms close to it, and less water towards the main. This island is at the end of the deep-water channel, is of considerable elevation on its south part, and has a remarkable sand-hill on its North end, to the eastward of which is a small fishing village; the inhabitants are in a wretched state. There are some wells of brackish water, but no cattle or other supplies. There is a very good bay on the north part of the island, called CORE GOOMAH, affording protection from all winds. It is formed by a bight in the south part of Farsan Kebeer Island, is 7 miles in length, East and West, and at the narrowest part is 1½ miles broad, and the same distance from the North end of the rocky spit, on the north side of Goomah, and the main. The deepest water is on the N.E. side of Goomah, where in the centre are 18 fathoms. The rocky spit bears from the sand-hill N. 30° E. (*true*). At the N.E. part of the bay is a well of fresh

Core Goomah.

water, but it is very scarce. Farsan village is about 2 miles to the North of it. In this part of Core Goomah is TIBTAH BAY; it is only a small merza for boats. Jibbel Cussar, bearing E. 4° S., is the leading mark for the harbour. Supplies of any kind are not procurable here. Tibtah Bay.

Nearly 3 miles S.S.E. (*true*) from Goomah is DOOMSOOK ISLAND, situated on the same shallow bank. This island is high, about 7 miles in circumference, with a core in it of 15 and 20 fathoms mud, which nearly divides it in two: there is no fresh water, but plenty of antelopes. To the southward of Doomsook are two circular banks, in the centre of the deep channel: the least water found on them is 6 fathoms, sand and rocks. Doomsook Island.

DOHARAB is a low sandy island, about 2 miles in length, North and South, in lat. 16° 18½′ N., and lon. 41° 59′ E., is surrounded by a reef nearly 2 miles wide, with 6 to 14 fathoms close to it. Five miles from its west side there are 25 fathoms, and 9 miles further West there is no bottom at 160 fathoms. The island is of triangular form, and has a small islet close to its N.E. side. Doharab Island.

Six miles N.W. by N. from Doharab, is another island of similar size, called MURRAK, and 2 miles further, in the same direction, is the little island DOWASSELA, both situated on a reef, which extends two miles South and West of Murrak, and 1 mile to the East of it, including another little island North of Murrack. There is a channel between the reefs which surround this island and Doharab, 2½ miles wide, with 11 to 17 fathoms in it. Murrak is about 6 miles within or N.E. of the depth of 24 fathoms, and 9 miles further S.W. there is no bottom at 160 fathoms. There appears to be no safe channel across the Outer Reef between Dowassela and its N.W. extremity, in lat. 17° 3½′ N., a distance of 16 leagues. There are several small islands and patches on it, now to be partially described. This part of the Outer Reef is called Shaab Farsan. Murrak and Dowassela Islands.

Four miles N.E. (*true*) of Murrack, in a line between that island and Doomsook, are the two little islands, OMEL ZAHUL and MAHAMAH, situated near the inner edge of the Outer Reef, about a mile apart, with 6 fathoms between them. To the W.S.W. (*true*) of Zelfeef, about 7 miles, is another small island near the middle of the reef. There are also three small sandy islands lying to the S.W. of Sarso, one distant 3 miles, the other two 6 miles. The water is very shoal on Shaab Farsan, in their neighbourhood. Omel Zahul and Mahamah Islands.

Six miles W. a little S. from the north end of Sarso, are DITHAHAYER and HARNEESH ISLANDS, close together, and both small and sandy. N.W. by N. from these, and 10 miles W.N.W. (*true*) from the north end of Sarso, is SALE MACOWA ISLAND, surrounded by a shallow bank, and several rocks to the eastward of it. This is the northernmost island on Shaab Farsan, and from it to the extremity of the bank are numerous dangerous rocky patches. Dithahayer and Harneesh Islands. Sale Macowa Island.

## THE COAST OF ARABIA, FROM RAS TOORFAH TO COOMFIDAH, WITH THE OPPOSITE ISLANDS AND SHOALS UPON THE INNER EDGE OF THE OUTER REEF, FORMING THE INNER CHANNEL.

From RAS TOORFAH the coast runs N. ¼ W. 27 miles to SHAB EL ABOO LOOKER, 7 miles to the South of which is SHAB EL KEBEER, a part of the coast reef, the centre of which projects 1½ miles from the shore, and gradually tapers away to the North and South. There are 4 fathoms close to the edge of the reef. From Shab El Aboo Looker, the coast turns to N.W. 8 or 9 miles to CORE EL ETWID, which runs a short distance into the coast, and has 2½ and 2 fathoms on it. There is a long shoal off the entrance, with 3 fathoms inside, and there is a 1½ fathom patch of rocks 2 miles W. by N. of the entrance, and 1 mile off the coast, with 5 fathoms just outside it. The village of Etwid is 5 or 6 miles inland. Jibbel Etwid, a very remarkable peak on this part of the coast, is to the N.E. of Core El Etwid, and will easily be known, as it appears quite unconnected with the range of hills in the neighbourhood, and is much nearer to the coast. El Etwid. Jibbel Etwid.

Eight miles N.W. (*true*) from El Etwid is GEEASS, off which is a long reef about 1 mile from the coast, with 2 and 3 fathoms within it; and nearly 4 miles West of this place is a patch of rocks, with 4½ fathoms on it. About 9 miles further is EL MAJIS, a Bedouin village, well peopled, off which the coast reef projects nearly 3 quarters of a mile, forming the little CORE EL MUCKERAH to the North. Between Geeass and El Majis, at 3½ and 6½ miles from the former, are SHOOKAKE and COOTOOF EL MUSSAREE. Geeass. El Majis. El Muckerah.

WIDAN is 12 miles N.W. (*true*) of El Majis; at this place a narrow neck of land projects from the coast, forming a semicircular bay, three-quarters of a mile broad, affording good protection from southerly winds only; the depths within are 3 and 4 fathoms: seen from the westward, this point of land has the appearance of an island. There are no buildings nor fresh water, but cattle are plentiful. Widan anchorage.

There is a high hill close to the sea, on the northern part of Widan anchorage, called Jibbel Buggarah. Jibbel Ruckerbut Chuddore, is a high hill forming a cape to the southward of Widan anchorage. Jibbel Hooseniel Marjis is the southern extreme of the range of hills just described; its northern part is conical, with a fort on it. Jibbel Widan lies East of Jibbel Buggarah; the centre, or highest part, forms a small peak. Jibbel Buggarah. Jibbel Ruckerbut Chuddore. Jibbel Hooseniel Marjis. Jibbel Widan.

From Theran Island to Widan, there is anchorage all along the coast, and the names of places are as already enumerated, and as given in the chart; there are said to be many small villages along this part of the coast a few miles inland. Anchorages.

W.N.W. (*true*) 5 miles from Widan is KOTUMBLE ISLAND, situated about 2 miles from the main. It is Kotumble Island.

about half a mile in length, and forms a rugged peak, like a quoin, four or five hundred feet high, with a steep ascent on its north side, the only part accessible. The top of it is only a few yards in length, and very narrow, forming a perpendicular declivity to the South and West: on the East it forms a steep slope. The character of the rocks found on the island is volcanic; but there is no volcano now, nor is there any appearance of any eruption having taken place for many years. There are 12 fathoms between Kotumble and the main. About 3 miles S. by E. from Kotumble, and 3½ miles westerly from Widan, is a patch, with 30 fathoms to the northward of it.

Cussar. CUSSAR is a small Bedouain village, 7 miles N. 41° W. (*true*) from Widan point, and north 3 miles of Kotumble; here are the ruins of a brick-built fort, but no supplies can be procured. At 4 and 7 miles N.W. from Cassar lie the South and North roadsteads of EL WUSSIM, both affording good anchorage and protection, but it would be difficult to get out from the former in southerly winds. The latter has a bar of sand across the entrance, which connects the shore reef to the shoal on the north part of the entrance. The least water found on the bar is 2½ fathoms; within it there are 6 and 7 fathoms mud. The remarkable hummocks between these anchorages will direct to either of them: these are three steep and lofty hills, in one, when bearing East, the anchorage lying to the South and North of them. The outer or westernmost hill is called Wussim; the inner one the third hummock, and the centre one the fourth.

El Wussim, South Anchorage. El Wussim, North Anchorage.

Aboo Lelf and Assore Islands. N. 17° W. (*true*), distant 5 miles from El Wussim North, and close to the shore, is ABOO LELF ISLAND; and 3 miles N.W. ½ W. (*true*) from it, another island, called ASSORE, about a mile from the coast: the former, a small quoin, separated from the shore by a narrow shallow channel; the latter, a low wooded island, and both surrounded with reefs forming good anchorages. The reef extends westward 2 miles from Aboo Lelf, from whence it bends to the S.E., forming an inlet 1½ miles deep to N.N.W. opposite Dahban, in which it is not advisable to anchor with southerly winds.

Dahban.

The reefs above Assore Island, and to the northward of it, extend about 3 miles from the coast, and form inlets to the South and North of that island, with good anchorages, which will be better understood by looking at the chart than by any description that can be given. The same may be said of El Burk, about 4 miles to the north of Assore Island. This Core, or inlet, runs into the land to the North, and the west side of the entrance is partly formed by the coast-reef, extending southward from a projecting part of the coast. Here a vessel may find good shelter from all winds. In the entrance is a shoal patch, the least water found on which is 4 fathoms; within are 5 fathoms mud. There are some wells of good water near the shore, where are some date trees; and there are the remains of a strong-built wall of unhewn stone, but no houses. The Shifting Peak, bearing N. 86° E. (*true*), leads to the entrance of this Core.

El Burk. Good anchorage.

Nahood. NAHOOD is a good Core, 3 miles to the North of El Burk; at its entrance Jibbel Tuse Sharm bears N. 65° E. (*true*).

In the neighbourhood of Merser Nahood and El Burk, the range of hills converges towards the coast, the tops resembling the roof of a barn. Amongst these, there are two larger than the rest, called by the natives, Jibbel Tuse Sharm and Jibbel Tuse Yemmenere, or the woman's breasts. From El Burk they appear in the northernmost part of the range of hills, and then will be better known by having to the southward a detached piece of land, shewing more like a barn than either of them.

Jibbel Tuse Sharm. Jibbel Tuse Yemmenere. Shifting Peak.

Shifting Peak is in the second highest range of mountains to the westward of Napood hills, and is very conspicuous when seen from the northward.

Opposite Nahood the Inner Channel is 1½ miles wide between the coast reef and a bank which extends eastward from Jeseeral Mogid, hereafter described. About 11 miles further northward is ERNEGE, a small Core formed in the coast reef, with 6 or 8 fathoms water. Here are no houses nor huts to be seen, nor can fresh water be procured.

Ernege.

Ome Kergane. Between Nahood and Ernege is a bank lying parallel to the coast, called OME KERGANE, forming the west side of the Inner Channel, which is little more than a mile wide. The north end of this rocky bank is 3 miles South of Ernege; it thence extends 6 miles southward, and is 1½ to 2 miles wide. Its north part is rocky, shallow, and uneven; on the south part the water is somewhat deeper. Within this bank there is no coast reef, and the mid-channel depth is about 20 fathoms, but there are two shallow patches at the north end of it.

Jafofe. Four miles to the northward of Ernege is JAFOFE, the coast between forming a point, from which a reef extends southward 2 miles, with 2 fathoms on it, within which are 9 to 6 fathoms in Ernege anchorage. Between this reef and Ome Kergane is a patch, with 2½ fathoms on it.

From the last-mentioned point of land to Halli point it is 7½ miles N.W. (*true*), the coast between forming a bay, with good anchorage in 5, 7, and 8 fathoms, well sheltered from N. and E. winds, but the coast is bordered with a reef. On the east side of the bay, besides Jafofe before mentioned, is BOJAMAR, nearly East from the point; there is neither house nor hut at either of these places.

Good anchorage. Bojamar.

Halli Point. The Point of HALLI is bordered with an extensive reef, and some patches; the anchorage off this point, in 6 or 7 fathoms, is rather exposed. There are no houses to be seen, but a town or village is said to be not far inland.

N.W. by N. (*true*), 8 miles from Halli Point, is a projecting point of land, called RAS EL ABOO KALBE; the reef, about mid-way between, extending 2 miles from shore, with 4 fathoms close to it. Five miles to the northward of the point is Serome, and 4 miles further is Undareh, off which Jibbel Halli bears N. 88° E. (*true*). SEROME has a small anchorage for boats. Ras el Aboo Kalbe. Serome.

The anchorage at UNDAREH is formed by a shoal of the same name, the South part of which has patches that are dangerous. The safest channel, in or out, is to the northward of the reef; and if going out through the South entrance, run 3 or 4 miles to the southward of the anchorage before hauling to the westward. The depth at the anchorage is about 7 fathoms. Upwards of 3 miles N.W. (*true*) is RAS ABBOO MUTNAH. Undareh. Ras Abboo Mutnah.

MERCASSER is about 4 miles N. by W. (*true*) from Ras Abboo Mutnah, and nearly 11 miles S. 18° E. of Coomfidah. This place has good protection from southerly winds, but there are some small patches in the entrance to the anchorage. The place will be known by the MOOLGAMARREE ISLANDS, which are in its neighbourhood, and have anchorage all round them. Six miles N.N.W. (*true*) of them is UMMUSSEEFAH ISLAND; they are all low sandy islands, covered with bushes, and there are some rocky patches in their neighbourhood, easy to be discerned. The best channel is between the islands and the main: or you may pass between the islands, avoiding the rocky shoals South of them, and a rocky patch off the northernmost one. Mercasser. Moolgamarree and Ummusseefah Islands.

COOMFIDAH is a small town, surrounded by a wall, and is under the Turkish government: it has two forts towards the sea, and to the southward, without the walls, is a mosque, with a minaret. It has a small bazaar, which affords sufficient for the consumption of the place; but by waiting a few days, supplies of cattle may be obtained from the interior. The best water on the coast is to be had here, and as quickly as the ships' boats can carry it off: it is brought down in mussucks, on camels, alongside the boats, and the casks filled. In July and August, good grapes are also to be had. Coomfidah.

The anchorage is formed by a low bushy island, off the port, which is surrounded by a reef, easy to be seen, and may be approached close in luffing up to fetch the anchorage. There is a small shoal to the North of the island, and the best channel is between it and the island reef, where there are 7 and 8 fathoms. There is a narrow channel, of 5 or 6 fathoms, to the eastward of the island, used by boats: it is formed by the island reef and a rocky spit off the town. There is also a shallow channel of about 2 fathoms to the North of the small shoal in the entrance, but it is rocky, and not to be recommended. There is good, well-sheltered anchorage in 2¾ fathoms, mud, with the North fort bearing E. 25° N. and the South fort E. 15° S. The remarkable mountain, Gose Abool Ire, bears E. 7° 30′ N. from this anchorage. Anchorage.

JIBBEL HALLI mountain is to the S.E. (*true*) of Coomfidah, in the nearest range of hills: it is a very remarkable, pyramidal piece of land, when seen from that place and to the North of it; but in proceeding southward it quickly alters, and at Undareh it appears an oblong hill, with its northern part rounded off abruptly. Jibbel Halli.

Having completed the description of the coast, from Ras Toorfah as far as Coomfidah, we shall return to the southward, and commence a description of the islands, rocks, and shoals, on and near the inner edge of the outer reef, which may be considered as forming the western side of the Inner Channel.

The first is a patch of 2 fathoms, lying N. 42° W. (*true*) 7½ miles from Theran Island and 11 miles from shore; 18 fathoms are close within it. West about 2 miles from this patch is another, a rocky patch, of 2 to 4 fathoms, with 30 fathoms between them; and about 2 miles further N.W. a rocky patch, 2¼ miles over, with 3 or 4 fathoms on it, and 18 close to the westward of it. W.N.W. (*true*) 22 miles from Theran Island is the south end of MUMMARLE SEGGEER, a narrow coral reef, over which the sea breaks in some parts, extending about 10 miles N.N.W., with a rock about 15 or 20 feet above water at the north end, called MUTBARHANE. E. 14° S. 13 miles from Mutbarhane is a 3 fathoms' patch, with 33 and 36 fathoms close to it; this is 13 miles from shore. One mile South of Mummarle Seggeer is a rocky patch, with 47 fathoms between, and from 3½ to 5 miles East of its south end are three rocky patches. Five miles N. by E. (*true*) from Mutbarhane is the east end of MUMMARLE KEBEER, extending W. by N. 9 miles, of a triangular form, being 5 miles wide at the west end, in a N.E. direction; it is full of patches, with deep water between them. This shoal lies 13 miles from shore, south-westward of Muckerah. Patches N.W. of Theran. Mummarle Seggeer. Mutbarhane. Mummarle Kebeer.

S. 18° W. (*true*) 10 miles from Kotumble Island, and the same distance from Widan (the nearest shore), is a rocky reef, about 1½ miles long; and to the S.E. of it, 1 mile, a rocky patch, with 19 fathoms between them: there is no ground at 30 fathoms at 1 mile within. To the southward of the latter, 2 miles, is a 4 fathoms' patch.

SIMMER ISLAND, in latitude 17° 47′ 30″ N., longitude 41° 28′ E., lies W. by S. (*true*) distant 19 miles from Widan. This island is 1½ miles in length, East and West, and half a mile wide: it is very low, composed of coral and sand, and principally covered with decayed wood. The soundings are deep around it; and if anchorage is required, it may be conveniently obtained either upon, or on the western edge of, the shoal to the N. and N.E. (*true*) of it. There are two small rocky patches 3½ miles S.E. (*true*) of the island. There is a shoal to the N. and N.E. (*true*) of Simmer Island, 5 miles in length and nearly 3 miles broad; the soundings obtained on it are from 3 to 19 fathoms; but there may be spots with less. On its western edge are 13 fathoms, mud, Simmer Island.

gradually increasing to the N.W. This shoal commences about $1\frac{1}{2}$ miles N.E. of the island, and there is no bottom at 50 fathoms midway between them. N.E. (*true*) 6 miles from the island, is a rocky patch.

Jeseeral Mogid Island.

JESEERAL MOGID, in latitude 18° 13′ 30″ N., longitude 41° 24′ E., is a low sandy island, with a large reef round it, which is joined to a bank of rocks and sand that forms the inner channel, before spoken of. Ten miles S.E. by S. (*true*) from Mogid is a rocky patch, on the south end of the aforesaid bank; and about 3 quarters of a mile S.E. (*true*) from it is a patch of 7 fathoms, at the distance of 4 miles from the coast reef, having 30 fathoms and upwards between. From the rocky patch, the east edge of the bank extends North 12 miles, narrowing the inner channel from 4 to $1\frac{1}{2}$ miles opposite Nahood, where the bank terminates. The south end of the bank is narrow; but opposite Mogid its breadth increases suddenly, the eastern edge extending nearly 6 miles from that island. The depths on it are various and irregular, from 2 to 30 fathoms, the former being found $3\frac{1}{2}$ miles E.N.E. (*true*) from the island; and there are 4 fathoms 2 miles North of the rocky patch, with 26 fathoms between.

West of the south end of this bank, about $2\frac{1}{2}$ miles, is a rocky bank, 3 miles long, with 4 to 13 fathoms on it.

About 2 miles North of Jeseeral Mogid bank is the south end of Ome Kergane bank, already described.

Hadarah Bank and Islands.

North of Jeseeral Mogid, 7 miles, and nearly 4 miles West of Ome Kergane bank, is the S.E. end of a half-moon-shaped rocky bank, on which the HADARAH ISLANDS are situated, and which extends from thence N.W. and N. about 7 miles. The Hadarah Islands are low and sandy, and covered with bushes, giving name to the bank on which they are situated.

Gad Hadarah Island.

GAD HADARAH is a low sandy island, with an extensive reef lying N.W. and S.E. (*true*), having a channel between it and the north end of Hadarah bank, with 14 to 23 fathoms water. Nearly 3 miles East of Gad Hadarah is a similar island, on a reef that extends N.W. from it a short distance. Nearly 2 miles E.S.E. from this island is a patch of 2 fathoms, and half a mile S. by W., another of 1 and 3 fathoms, with a channel of 17 fathoms between; and 2 miles East of the S.E. of Hadarah Island, is a patch of 1 fathom.

Ul Gereef Bank.

UL GEREEF is an extensive rocky bank, full of dangerous patches, upwards of 8 miles in length, North and South, and 4 miles in breadth; it lies 5 or 6 miles S.W. of the Hadarah bank and 8 miles to the W.N.W. of Jeseeral Mogid.

Jeserat Gootna Island.

JESERAT GOOTNA lies about 9 miles W.N.W. (*true*) from the Hadarah Islands: its south point is in lat. 18° $27\frac{1}{2}$′ N., from whence it extends nearly 5 miles North, and is nearly 2 miles wide in the broadest part. It is a low coral island, with bushes, and is surrounded by a reef which extends off nearly 3 miles to the S.E., with some large rocks above water, like small islands. The soundings to the eastward of it are 30 and 35 fathoms, mud, decreasing gradually to the coast. The other sides have deep water.

Jibbel Sabyar Island.

JIBBEL SABYAR is 2 miles North of Jeserat Gootna, and is about 2 miles square and 60 feet high, sloping a little at the top, towards its rugged sides. On its western side is a village of fishermen's huts.

Ferandeer Islands.

N. by W. $\frac{1}{2}$ W. (*true*) nearly 5 miles from Jibbel Sabyar, are the FERANDEER ISLANDS, which are two small oblong, irregular, table-topped, black rocks, about 40 feet high, situated upon the outer reefs; and N.N.W. (*true*), about 5 miles from these rocks, is the low sandy island DUBARAH.

Dubarah Island.

Between the Ferandeer Islands and Jibbel Sabyar, between Jibbel Sabyar and Jeseerat Gootna, and between the latter and Ul Gereef Bank, there are said to be intricate channels, leading to the West and S.W. to sea, passing between sand-banks and dangerous patches of sunken rocks; but the pilot refused to take the surveying ship. By a single glance at the chart, it will be readily seen that there is not any safe or proper channel that ships could attempt.

Rocky Shoals.

Due East from Ferandeer, about 6 miles, or nearly in mid-channel, is the south end of some rocky shoals, which extend to the northward about 4 miles, the north part being about 3 miles off the coast: they are in broken ridges, having some parts above water; and to the West of these, 2 and 3 miles, are three rocky patches. Three or four miles to the S.W. of Undareh, are some dry reefs, to the N.E. of which is UNDAREH REEF, which shelters the anchorage.

Undareh Reef.

The Moolgamaree and Ummusseefah Islands, and neighbouring patches, have been before mentioned: all these patches are easily discerned. N.E., 2 miles from Ummusseefah Island, is a rocky patch, with 15 fathoms between; and from 1 to 3 miles West, and W. by S. from Coomfidah Island, are three rocky patches. There are also several patches and low islands extending 4 miles to the South of Coomfidah: some of these are about a mile from shore, with from 6 to 12 fathoms between them and the coast reef.

## THE COAST OF THE HEDJAZ FROM COOMFIDAH TO LEET, WITH THE ISLANDS AND SHOALS ON THE INNER EDGE OF THE OUTER REEF, FORMING THE INNER CHANNEL.

From Coomfidah the coast runs north and north-westerly to Ras Mutweer, a distance of 13 miles N.N.W., having several rocky patches and low islands between, at 1 to 2 miles from the coast. At 9 to 12 miles from Coomfidah are some patches in mid-channel, and to the westward of it. S.W. (*true*) about 1½ miles from Ras Mutweer is the north end of a reef, which extends 2½ miles S.S.E., having two small islands upon it; and the coast reef runs off west 2 miles from the Ras, forming a point with 6 fathoms at its extremity, whence it runs North and joins the coast. Between this and the reef last mentioned is a channel, a mile wide, with 5 and 6 fathoms on it; the channel to the westward of the reef, between it and the Farrar Islands, is 4 miles wide, with 12 fathoms on it, and at Coomfidah it is 8 miles wide, with 18 to 20 fathoms. Ras Mutweer.

The south end of the FARRAR ISLANDS is in latitude 19° 17′ N. distant 5½ miles from the coast; they thence extend 13 miles in a N.N.W. (*true*) direction, and are all low sandy islands, with a few bushes, situated in the eastern edge of the outer reefs, and form the western boundary of the Inner Channel. To the southward of these islands the edge of the reef is marked by rocks and rocky patches, with 18 to 20 fathoms close to it. The CUFFEEL ISLANDS are next to the Farrars, and are of a similar description, and similarly situated on the inner edge of the bank; they form a segment of a circle from W.N.W. to N. by W. (*true*), 9 miles. Farrar Islands. Cuffeel Islands.

From Ras Mutweer to Ras Mahasin it is 21 miles N.W. by N. (*true*); this is a long point or tongue of land running out to N.W., and is 5 miles N.E. by N. (*true*) from the North extreme of the Cuffeel Islands. The coast between these places runs North and N.W. from Ras Mutweer about 11 miles to DOGAR. At this place there is good anchorage in 5 fathoms to the eastward of a small patch which forms the roadstead. Here are a few huts, and the inhabitants are civil, but no fresh water to be obtained. Two reefs lie to the West and South of Dogar, extending about 5 miles S.S.E. (*true*) with some small islands on them; they are from 1 to 2 miles off shore, and there are 6 and 7 fathoms between them and the coast reef. Some patches lie N.N.W. of them, and from these others extend westward, with 6 to 8 fathoms between them to near mid-channel, where there are two small islands, with 12 fathoms close to the S.W. of them; these are about 2 miles S.W. (*true*) of Ras Zoogabe. There is a reef to the North of these islands. N. by W. 2½ (*true*) miles from them, and S. by E. 2½ miles from Ras Mahasin, is a small island with a reef running west 1 mile from it. The channel is to the westward of all these islands and reefs, is nearly 4 miles wide, and has from 12 to 9 and 17 fathoms on it. Ras Mahasin. Dogar. Anchorage. Ras Zoogabe. Ras Mahasin.

It is 7 miles from Ras Mahasin to that of El Hummar, a tongue of land running southward, and with the former forms a bight or bay in the coast, bordered throughout with a reef. In the mouth of this bay is an island, about 3 miles long North and South; and reefs and patches, with channels between them, extending from its North end to the north point of the bay. There are also reefs and patches on the east side of the island in the bay; and off its south end and west side there are numerous reefs and rocky patches, with deep-water channels between, extending across the channel to Serrane Island, a distance of 5 miles. El Hummar.

SERRANE ISLAND is high with an irregular top, about 7 miles long and 1 broad; it is surrounded by a broad reef of madrepores, and some patches on the S.E. part, which forms the inner boundary of the outer reefs. It consists of madrepores and sand, and is not inhabited, there being neither water nor wood. There are some patches to the S.E. of it on the edge of the reef, which here bends to the South, and joins the Cuffeel Islands. Serrane Island.

There are 19 fathoms close to the N.E. of Serrane, and S.E. (*true*) of it is a patch close to the reef, between which and another to the N.E. of it about a mile (of those before spoken of) is the best channel.

From the east end of Serrane, the edge of the reef, studded with patches and rocks, runs N.N.W. (*true*) about 10 miles to the S.E. end of JENNARBET ISLAND, about 2 miles in length, very narrow, and surrounded by a reef; a similar island, about half its length, lies to the N.E. of it, also surrounded by a reef, both are low and bushy. Jennarbet Island.

N.W. ½ N., 8 (*true*) miles from Ras el Hummar, is RAS EL ASKAR, and 5½ miles further on the same bearing is Gillargin, the coast being bordered with a coral reef throughout the whole extent. About W.N.W. (*true*) 2 miles from Ras el Hummar, and about mid-channel, is a small island, surrounded with a shoal, with 15 fathoms on its S.W. side, and a patch about a mile to the westward of it. About ¾ and 1½ miles N. by W. (*true*) from this small island are two others, of a similar description; and between the northernmost and the small island N.E. of Jennarbet is a small island, also surrounded with a reef, having a channel between, with 15 fathoms on it.

Off the N.E. side of the small island eastward of Jennarbet are two small islands, with reefs round them. The outer reef hereabout approaches nearer to the coast than it does farther southward. An extensive reef between forms two channels; that nearest the coast, the narrowest, being in one part, opposite Ras el Askar, only 400 yards broad, with a depth of 5 fathoms. RAS EL ASKAR may be known by having trees on its points, there being no others on the shore near it. Ras el Askar.

Inner and Outer Channels.

This Inner Channel is considered the safest, as the shoals can be much better seen than in the outer one, although the outer one is almost always used when the wind is to the westward, as by going through the inner one, they would, in all probability, have to tack to clear the coast, and regain the centre of the channel.

In going through either of these channels it requires a good look-out, and coming from the southward, the extensive reef in patches that separates the channels will be seen, and the sand-bank on the South part of it; these will be a good guide to judge your distance from the patches forming the West side of the Outer Channel, on which the least water found was 3 fathoms.

Directions for the Inner Channel.

If going through the Inner Channel, pass in between the sand-bank just mentioned and an island S.E. of it, taking care to avoid a shoal of 2 fathoms in this channel about half a mile off the island, with 13 fathoms close to it; or pass inside the island, keeping a good look-out for the patches off them, where the least water found was 3 fathoms.

The clusters of patches forming the two channels of Ras el Askar have deep water between, and on many of them there are 2, 3, and 4 fathoms.

Gillargin.

GILLARGIN has good anchorage in 10, 9, or 8 fathoms, mud: going in from the N.W., after passing Shab el Muthar, hereafter mentioned, steer for the point of the reef off the entrance, and leave all the sunken patches that are visible on the left hand in passing them. At this place there is neither house nor hut.

Raker.

RAKER lies N.W. ½ N. (*true*) about 8½ miles from the point of Gillargin, the coast between forming a bight, bordered with a coral reef, in which are several patches of 3 and 4 fathoms with 20 and 24 between them. Raker will be known by the high sand-hills close to the beach to the eastward of it: it has good anchorage formed in a bight of the coast reef, in 4 fathoms, mud, well protected. The reef here extends nearly 2 miles from the coast, and there are some rocky patches off the entrance, and also an extensive shoal in patches from S. by E. to S.W. (*true*) of it, called SHAB MULTHAR, nearly a mile off the coast reef; and there are other patches S. and S.E. (*true*) of it.

Shab Multhar.

It is 13 miles N.W. by W. and N.W. by N. from Raker to Leet, and for more than half the distance the coast reef extends more than 2 miles off, after which its breadth decreases to about half a mile, with some patches off it, and 6 to 10 fathoms at a short distance from it. The anchorages of LEET are formed and sheltered by patches, the largest of which is full 3 miles to the south-westward. A vessel going to Raker, and being just outside this patch, should first steer out about S. 40° E. (*true*) for 7 miles, taking care not to get into less than 14 fathoms, to avoid the extensive patches off the shore reef; and when to the South of these, a S. 80° E. (*true*) course for 5 or 6 miles will carry her to the entrance of Raker; but the soundings are very irregular, from 12 to 5 fathoms, rocks.

Anchorages at Leet.

LEET.—The inner anchorage is small, but is well protected by the two reefs off it, between which is the best entrance: the depths are from 4 to 6 fathoms, mud. In leaving this place, if going to the southward of the eastern patch, it will be necessary to luff close round its point to the south-westward, to avoid many dangerous patches off the shore reef. The best anchorage in the outer road is to the S.S.W. (*true*) of Aga Island, where there is 10, 12, and 14 fathoms water, mud. About 1½ miles to the S.W. (*true*) of Leet is an extensive reef of innumerable patches, with a channel on either side of it. AGA ISLAND is to the West of Leet anchorage, and is a small sandy island. The town of Leet consists chiefly of huts with a few mud buildings, and is situated to the S. E. of the inner anchorage, about 1 mile from the beach. Fresh water can be procured at that distance, but other supplies are very scarce.

Aga Island.

Leet Town.

Jibbel Dogger.

DESCRIPTION *of the interior land between Leet and Coomfidah.*—Jibbel Dogger is a most remarkable piece of land, on the highest range of mountains to the northward of Coomfidah: in that direction it runs off to a peak, but its North extremity forms more like a quoin, the thickest part of which is to the north. Jibbel Shager, or South Peak, is a remarkable piece of land, on the second range to the N.W. of Jibbel Dogar. GOSE ABOLE IRE is in the highest range of mountains to the Eastward of Coomfidah; its northern brow forms a high mound until well to the southward, where it becomes rugged: its south brow has a small but conspicuous peak. This mountain may be seen to the northward of Ras el Askar.

Jibbel Shager.

Gose Abole Ire.

From Jennarbet north-westward.

Having completed the description of the coast and reefs as far as Leet, we will return to Jennarbet Island, and continue the inner edge of the outer reef. From Jennarbet the reef runs in a curve to N.W. and N. about 6 miles, and there forms a large round reef, with two patches on it, bearing N.W. by N. from the east end of that island. It there forms the N.W. end of the West channel off Ras el Askar, having in it 12 fathoms. From this part the reef turns away N.W. by W. (*true*) 6 or 7 miles, having rocky patches close to its edge, and from thence W.N.W. and W.N.W. ½ W. (*true*) to its north extremity, where there is a rocky patch 10 miles S.W. by W. from Aga Island. All along this space there are many rocky patches, and deep water on the edge of the reef, but no passage through to seaward. About 3 miles within the edge of the reef is ABOOLAAD Island, in lat. 19° 58′ N. nearly 12 miles S.S.W. ½ W. (*true*) from Leet anchorage.

Aboolaad Island.

JIBBEL ABOOLAAD, or ABOOLAAD Island, is 2½ miles long, in a N.W. and S.E. direction, three

quarters of a mile broad, and 250 to 300 feet high, and surrounded by a sandy plain. It is quite barren, and destitute of water: branches of coral are observable sticking out of its highest parts. There is a small port for fishing boats on the west side; and beyond it, breaking reefs in that direction as far as can be seen from the top of the island. There are also several rocky patches near the edge of the reef to the northward of the island.

Having completed the Inner Channel, so far as Leet and the N.W. end of the Outer Reef, we will return to the southward and commence with the Patches, Shabs, and Islands, on and near the outer edge of the outer reef, observing that the Chart must be the principal guide as to their position, as many of them are without names.

Thirteen miles West from Mummarle Segger, heretofore described, and N. 10° E. (*true*), 9 miles from Mutterhane rocks, is a shoal patch, with 90 fathoms close to the west side. N.N.E. (*true*) 2½ miles from this patch is the South end of a long shoal, with 5 and 4 fathoms, extending 8 miles North, 1½ miles wide, with 12 to 5 fathoms on its north end, which is about 9 miles West of Mutbarhane. About 2 miles S.E. of this is another long shoal. There are 5 patches, of 3 to 5 fathoms, lying from 7 to 15 miles to the northward of the extremity of the dangerous patches on the N.W. part of Shab Farsan. S.E. ½ S. to S. ¾ E. of Simmer Island, from 9 to 15 miles, are several rocky patches with deep water near them; and about S.W. ½ S. from the same island, 24 to 26 miles, is a cluster of rocky patches, and some with 2 and 3 fathoms on them; and to the westward of these, from 3 to 7 miles, are others, with 3 to 4 fathoms on them. S.W., 22 miles from Simmer Island, are two rocky patches, with no bottom, at 25 fathoms between them; and 130 fathoms, mud, at 2 miles to the N.E. On the same bearing, 14 miles from Simmer Island, is another patch; and other clusters lie S.W. by W. and W.S.W., at 10 to 15 miles from the same island. S. 76° W. (*true*) distant 27 miles from Simmer Island, is the southernmost of the Wussaleat Islands, in latitude 17° 40′ N., and long. 41° 0′ E., the other lies North 2 miles from it, both low and sandy, with the remains of an old hut on one of them: they are situated upon a sand and coral bank 4 miles in length, and nearly 2 in breadth. These are the first islands met with near the outer edge of the reef, to the northward of Shab Farsan. S.W. 5½ miles from the south island, is a rocky patch, called SHAB EL JURMAH, and 3 miles S. by E. of the island is a 2-fathoms patch, with 28 fathoms between. Shab El Jurmah is within 5 miles of the edge of the reef. West 5 miles from the north Wussaleat Island is a dangerous rocky patch.

*Various nameless Rocky Shoals and Patches.*

*Wussaleat Islands.*

*Shab el Jurmah.*

W. by N. 14 miles from Simmer Island is DAHRET SIMMER Island, surrounded by a reef, with 7 fathoms close to the North of it. At 2½ miles S.W. is a rocky shoal 2 miles long, with 1 fathom on it, and 20 fathoms close to its north end; and W. by N. 1½ miles is a similar shoal of 1 fathom. S. 64° W. (*true*), 9 miles from Dahret Simmer is a rocky shoal, also one 1½ miles North of the island, and 4 miles N. by E. is another, having a channel between, with 18 to 25 fathoms. At 10 miles N.E. by N. from the same island is a rocky shoal, with 6 fathoms on its South end: and 4½ miles N.W. ½ W. from the island is a large rocky shoal, which has 2 fathoms on it and no bottom, with 105 fathoms of line close to its east side; N. by E. from it, about 2 miles, is another shoal about 2 miles long N.N.W.; between these there are 42 fathoms, and W. by N. from the latter 1½ miles is a rocky patch, with 38 fathoms between them: W. by N. ½ N. 3½ miles farther is a cluster of rocks, with 115 and 118 fathoms to the West, and 30 and 40 fathoms to the East, of them. The 118 fathoms just mentioned is close to the eastward of an extensive shoal of sharp pointed rocks, with deep water between them, and no bottom, at 50 fathoms close to the west side.

*Dahret Simmer Island.*

From Dahret Simmer to the easternmost of two small sandy Islands, called DAHRET MERAY, it is N.W. by N. 13 miles; this is surrounded by a reef, the other is 2 miles further West, and there is a rocky patch between them. There are also patches of rocks to the southward of both, and 4 miles S.W. of the westernmost is the shoal of sharp pointed rocks just spoken of. E. by N. ½ N. 6 miles from the eastern Dahrat Meray, and S.W. ¼ W. 14 miles from Jeseeral Mogid, is a rocky shoal about 3 miles long in the latter direction, with 6 to 14 fathoms on its west end; and N.E. and S.W. of it, distant 3 miles each way, are two rocky patches, with 28 fathoms between, and no bottom at 50 fathoms to the North of the north-westernmost.

*Dahret Meray Island.*

From the eastern Dahrat Meray to Zuggak is 12 miles N. 84° W. and S. 50° E. (*true*), 3 miles from it is DAHRET ABOO MUSSALAH. The latter is a very small sand-bank or island—the former is something larger, and either a sand-bank or a small sandy island; they are both low, and have not a bush upon them. Between these two islands is the north part of SHAB MARASS, on which the water breaks; it extends from thence 8 or 9 miles to the southward, and is from half to three quarters of a mile broad; there are some parts where it may be crossed, but the south end breaks, and has 15 fathoms close to its east side: farther North, there is no bottom at 50 fathoms. From three quarters of a mile to one mile and a half to the N.E. of the north point of Shab Marass are two small breaking patches; the southernmost, called SHAB URBEED, has 109 fathoms alongside of it. Between the N.W. point of Shab Marass and Zuggak Island is a one-fathom patch, and to the W.N.W. of Zuggak, from 1 to 1½ miles, is also a sunken patch of 1 fathom: on the western part, close to Zuggak, there are 115 fathoms. S.W. by W., at 3 and 5 miles from Zuggak, are two patches of rocks, and S.W. ½ S., 4 miles from it, is another. Between W. by N. and S.W. by W. of the breakers on the south end of Shab Marass, at 5, 6½, and 8½ miles' distance, are five rocky patches, and at 9 miles on the latter bearing is a patch of 5 fathoms. There is also a patch S. by W. 5 miles from the same breakers.

*Zuggak and Dahret Aboo Mussalah Islands.*

*Shab Marass.*

*Shab Urbeed.*

Shab Alli.

SHAB ALLI is a long breaking reef 8 miles N.E. by E. of Zuggak, and there is another breaking patch $5\frac{1}{2}$ miles W. by N. from it. N.N.E. of the latter, $2\frac{1}{2}$ miles, is a reef; and N.E. of the former, 2 miles, is another, with 14 fathoms close to the northward of it, and no bottom with 35 fathoms to the East of it.

El Elhallah, Eloom, Mugrabeah, and Sabeeah Islands.

From Zuggak to El Elhallah it is N.N.W. 10 miles, and thence to Eloom N.N.E. 3 miles; MUGRABEAH lies about midway between, and East of it about 2 miles is SABEEAH. The first of these is a sand-bank; the other three are small low islands of coral and sand, with no ground at 45 and 80 fathoms in their vicinity. To the N.E. of these islands a low sand-bank and two reefs were seen from the mast-head, and beyond them nothing but shoals.

Dorish Island.

DORISH is a low sandy island, with bushes on it, upon a coral reef, with no bottom at 40 fathoms close to the S.E. of it.

Aboo Dahrah, and Gebarah Islands.

N.E. by E. $\frac{1}{2}$ E. about 9 miles from Dorish is Aboo Dahrah, and $4\frac{1}{2}$ miles E. by S. from it is Gebarah, both small islands, and surrounded with shoals and rocky dangers, which preclude the possibility of a passage.

Aboo Sayel.

From Dorish to the South end of Aboo Sayel it is 8 miles N.N.E.; this is a narrow perpendicular reef of breakers extending 5 or 6 miles northward, and to the eastward of it 6 or 7 miles are other dangerous reefs.

Abbool Gullour. Sharbane Island.

N.N.W. about 9 miles from the same island is Abbool Gullour, a narrow breaking reef, about 3 miles in length, N.W. and S.E. To the northward of this last is SHARBANE ISLAND, 13 miles N. $\frac{3}{4}$ W. of Dorish. Sharbane is a small low island composed of sand and coral, with some bushes on it, and the remains of a fisherman's hut built of stones. It is in lat. 18° 43′ N., lon. 40° 43′ E.

Mooskka. Island. Tedgar Island.

MOOSKKA ISLAND is about 8 miles north of Sharbane, and 5 miles farther North is Tedgar. Mooskka is a small low island, situated upon a coral reef, and no bottom at 50 fathoms close to it. Tedgar is also a small low island with some bushes upon it, and a long reef off its south end: there is no bottom at 50 fathoms between it and Mooskka. There is a breaking reef 8 miles N.W. of Tedgar, another at 4 miles N. by E. from it, and a third at 2 miles to the N.E. Doshaggea is a small low island, E. by S. $\frac{1}{4}$ S., distant 6 miles from Tedgar.

Doshaggea Island.

Shaker Island. Shab Marass.

N.W. by N., distant 26 miles from Dorish, is SHAKER Island, in lat. 18° $52\frac{1}{2}$′ N., longitude 40° 30′ E. This is a small, low sandy island, with some bushes upon it, situated on a coral reef, and there is no ground at 120 fathoms close to its north point; half a mile to the westward of it is the north end of SHAB MARASS, a breaking shoal, which extends $2\frac{1}{2}$ miles S.S.W.: there is no ground at 70 fathoms between them.

Ring Reef.

Five miles N. by W. from Shaker is a ring reef of coral of about 2 miles across, with water breaking all round the edges, and apparently deep water inside. N.N.W. $2\frac{1}{2}$ miles from this is the East end of a narrow breaking reef, which extends about $3\frac{1}{2}$ miles W.N.W.; and 4 miles N.W. by W. $\frac{1}{2}$ W. is a breaking patch in latitude 19° N.

Marrar-but-el Khyle Shoals. Shab Umbarrack.

This cluster is called the MARRAR-BUT-EL KHYLE Shoals. Thirteen miles W. by N. of the ring reef, also in the parallel of 19° N., is a breaking patch called SHAB UMBARRACK, which forms the outer part of the reefs in this neighbourhood.

Eleven miles N. 10° W. (*true*) from Shab Umbarrack is a small shoal, with 1 fathom on it, and no ground at 145 fathoms close to it; and about 3 miles N.E. of it is a breaking coral reef, 4 miles long, N.N.W. and S.S.E.

Shab Assugga.

SHAB ASSUGGA is a low rocky coral island on a reef, lying about N.N.W. 7 or 8 miles from the breaking coral reef last-mentioned, and near the outer edge of the reefs having no ground at 105 fathoms close to it.

Jebbarrah and Dahnac Islands.

N.N.W. 4 miles from Shab Assugga is JEBBARRAH, a low coral island with no bottom at 105 fathoms close to it. DAHNAC is a low coral island surrounded by a reef, and no bottom close to, at 130 fathoms; it lies 5 miles N. by W. $\frac{1}{2}$ W. from Jebbarah, and both are surrounded by reefs. Two miles N.W. of Jebbarah is SHAB EL MULTHAR, and at the same distance N.E. is SHAB EL MAHATHUN, with a small sand-bank on it, and 4 miles N.E. is SHAB EL JEBBARAH. One mile and a half S.E. of Dahnac is a shoal patch, at the same distance N.E. is a breaking patch, and to the N. by W. $2\frac{1}{2}$ miles, is a half moon reef called SHAB AMAR, with 6 and 8 fathoms off its eastern verge. N. $\frac{1}{4}$ E. $5\frac{1}{2}$ miles is SHAB SHYIR, and one mile N.W. of it is SHAB ASSABAR, to the N.E. of which, $1\frac{1}{2}$ miles, is another; and N.E. by N. from Dahnac 5 miles, is SHAB EL GIRB. Within or to the eastward of this cluster, it appears from the mast-head, full of shoals.

Shab el Multhar, el Mahathun, and el Jebbarah. Shabs Amar, Shyir Assabar, and El Girb.

Mutatoo, Doharah, Murmah, and Jeddere Islands.

N.N.W. $\frac{1}{4}$ W. 16 miles from Dahnac is MUTATOO ISLAND, close to which there is no bottom at 130 fathoms; and N. $\frac{1}{2}$ E. from it $3\frac{1}{2}$ miles is Doharah, E. by N. from which 2 miles is Murmah. Jeddere is 2 miles E.N.E. of Mutatoo: these are four small sand and coral islands of little elevation above the sea: there is a small breaking patch half a mile N.W. of Mutatoo, and another $3\frac{1}{2}$ miles from Jeddere Island, the latter one called SHAB ASSUBB. From $2\frac{1}{2}$ to 5 miles from Doharah Island, and to the N. $\frac{1}{2}$ E. of it, there are several patches; the outermost and largest is called SHAB GENAB; and between them and Aboolaad Island, before described, and to the N.E. of MURMAH ISLAND, are many sunken patches and two long breaking reefs, one named SHAB SOOLAIM, and the other SHAB SHUBBUCK, with deep water close to them.

Shab Assubb. Shab Genab. Shabs Soolaim and Shubbuck.

Mutatoo is in lat. 19° 45′ N., lon. 40° 1′ E., and on it are the remains of a fisherman's hut, and a considerable number of graves.

## THE COAST OF THE HEDJAZ FROM LEET TO JIDDAH, WITH THE REEFS AND SHOALS LYING OFF AND NEAR TO THE COAST.

*Shab el Jeffine.*

W. ¾ N. from Leet, distant 8 miles, is the East point of SHAB EL JEFFINE, which extends from thence in a W.N.W. direction, parallel to the long island, JESEERAT KISHRAN, in patches to between Summar and Kishran. The soundings are mud about the east point of this Shab, and a vessel can anchor on the inner part of its point, just to the southward of the discoloured water. A good mark for it is the second peak.

*Summar. Kishran.*

SUMMAR is on the eastern side of the shoal, forming Kishran anchorage, and has 6 fathoms mud. This anchorage is preferable to Kishran, which has a rocky bar at its entrance, with 2¾ fathoms on it; the bar appears to connect the coast reef off Kishran with a shoal to the eastward of it, by which the anchorage is formed, with 5 and 6 fathoms (mud) in it. In a S.W. wind, a heavy swell rolls into this place, and the surf breaks on the bar. Tower Hill bears N. 12° E. (*true*) from the entrance.

*Merkat. Marram. Abbooshoke. Geedan. Merser Goofs. Samama. Jiddah.*

MERKAT is 11 miles N.W. ½ W. from Kishran: the anchorage is just to the South of the shoals off it, and affords a little shelter from westerly winds. Marram is 8 miles N.W. ½ W. from Merkat, and W. ¼ S. from Tower Hill: the anchorage is bad, there being straggling rocks in it. A vessel wishing to stop here had better anchor outside the rocks off it. Abbooshoke is 34 miles N. 36° W. (*true*) from Marram: this place has excellent anchorage in 6 fathoms, but the entrance is very narrow between the reefs off it; Jibbel Abbooshoke bears from this place N. 76° E. (*true*). Between Marram and Abbooshoke is Shedger, Amare, Soedah, Abboodoodah, Rugguan, Shaybah, Bahair, Muctar Redgmah, Gooss, and Mustubbud. Three miles to the northward of Abbooshoke is GEEDAN, where there is anchorage, tolerably sheltered, in 4 fathoms, from westerly winds, but open to the southward. JIBBEL ABBOOSHOKE bears N. 87° E. (*true*) from this anchorage: it is a small two-knobbed hill, about 12 miles from the coast. Merser Goofs is only a small bight in the coast reef, about 8 miles to the S.E. of Geedan: the anchorage is in 11 fathoms, on rocky bottom, but affords no shelter. SAMAMA is 22 miles N.N.W. from Geedan, and 14 miles to the southward of Jiddah. In the roads, Jiddah Senam peak is a little open to the northward of the Saddle. The anchorage affords tolerable shelter in 9 fathoms, mud. From Samama the coast trends about N. by W. ½ W. nearly 5 miles; it then turns in north-eastward 1½ miles, and then suddenly to N. by W. 2 miles; forming a low, sharp point, called Ras ul Uswud, from which Jiddah bears N.N.E. 8 miles, and from Jiddah the coast trends N.W. ½ W. 3 miles to Ras Gahaize. Between these projecting points the coast forms a bay, bordered with a reef, and in which are several others, forming various channels and anchorages. S.W. 1½ miles from Ras ul Uswud is the little island JESEERAT GORAB, situated on the shore reef.

*Jibbel Sardeeah.*

DESCRIPTION of the Interior.—Jibbel Sardeeah is a remarkable peak on the highest part of the land in the distant range to the N.E. of Marram: and a little to the eastward of it is a peak, still more remarkable, by which it may be known.

*Sugar Loaf.*

Sugar Loaf is a peaked mountain, its top forming three small peaks to the eastward of Kishran: it is in one with Jibbel Sardeeah and Tower Hill.

*Tower Hill.*

Tower Hill.—The range of hills from the northward converge towards the coast between Marram and Kishran, and the Tower Hill is a little inside the extreme of the range at Marram: it is a remarkable piece of broken land, not unlike a tower; but off Kishran, and to the S.E. of it, it forms with a double rugged top, and appears much larger in this last direction: the piece of land outside of it forms two round hills. First and Second Peaks are South of Tower Hill: these at Marram are the highest peaks on two sloping mountains, like quoins: they both form with two peaks each.

*West Peak.*

At Kishran there is a peak on the second range, called West Peak: it is between the first peak and Tower Hill; and the second peak in this direction forms a round mound on the high land to the right of the first peak, with a peaked elevation on each side of it.

*Jiddah.*

JIDDAH is one of the most considerable places in the Red Sea; it is in the province of the Hedjaz, situated in a low, sandy, and extensive plain, in front of a range of hills 10 miles distant from the sea: the land further in the interior being considerably higher and mountainous. The town, with its minarets, being white, has an imposing effect from the sea; it is enclosed by a wall half a mile square, with small towers at intervals, and the angles towards the sea are commanded by two forts, with about 10 embrasures each, but there are few guns mounted. In the North fort is a house, generally occupied by the officer in command of the troops; the south forms in two octagons joined; and in the northern part of it, which is the smallest octagon, stands the flag-staff.

There are three entrances to the town on the sea side, of which the centre and only public one is that at the

jetty, but the others are allowed to be used occasionally. There is also a gate on each of the other sides; that on the South is seldom opened; the northern one is common to all; but to the East is the Mecca gate, through which none but the professors of Islamism are allowed to pass. On the north side are three windmills, near which is an extensive tomb, asserted to be that of our mother Eve, and said to be fifty cubits long by twelve broad. The streets of this place are generally very narrow and irregular, and the houses are mostly composed of madrepore. There is an extensive bazaar, tolerably well supplied, and there is a bazaar-master, but strangers are charged exorbitantly. The only scarce article is biscuit. There is nothing considerable produced at Jiddah or in its vicinity as an article of trade, but from Suez they receive the most useful European articles.

The highest mosque in the town is in latitude 21° 28′ 20″ N., longitude 39° 15′ 37″ E., or 4° 1′ 45″ W. of Mocha.

Jiddah Harbour.

JIDDAH HARBOUR is, perhaps, the most extraordinary of any so called, as to its figure, and is so well protected from all seas that there is comparatively smooth water whatever winds may blow. It lies in a North and South direction, the utmost breadth being 780 yards; the narrowest part, facing the town, 340 yards, and the entrance to it, properly called the gateway, is 250 yards. This space is part of a streak or narrow channel, of irregular soundings, extending along the coast reef, which is bounded on the North by Ras el Gahaize, to the South by Ras el Uswud, and to the West by many breaking reefs, small islands, and sunken rocks, which have deep channels between them. The reefs to the westward of the harbour form in three clusters, containing innumerable patches, and running in a line parallel with the coast, stretching towards the two capes, whose distance apart is 10 miles.

On the south-western part of the outermost cluster of these reefs, and distant from them half a mile, is a dangerous patch of 1½ and 2 fathoms, called Marrueeah; and 8 miles to the westward of the town is the outer extremity of a bank of rocks and sand, with shoal patches on it, which is the westernmost danger off this part, and is hereafter fully described.

The tides are so influenced by the winds that it is impossible to establish a correct period for the time of high water. In December and January, when the place was surveyed, the greatest rise or fall on the springs was about two feet; but in the hot months, during the northerly winds, when many of the banks are dry, there is less water by about three feet than during the southerly winds in the cold season.

## DESCRIPTION OF THE HILLS, MINARET, AND OTHER MARKS USED IN THE DIRECTIONS FOR THIS PLACE.

North Hill. NORTH Hill is a high hummock behind the northern extreme of the near range of hills.

Oomarrar. Oomarrar is a rugged hill at the north extremity of the near range of hills; it has something of the quoin shape, with its bluff to the N.W.; when in one with the former hill, it bears S. 41° W. (*true*).

Sugar Loaf. Jibbel Yemeneer, or Sugar Loaf, so called from its resemblance thereto, when in one with the mosque, bears N. 74° E. (*true*).

Saddle Hill. Jibbel Addar, or Saddle Hill, is the highest land about Jiddah, and in the centre of the range; it is sunk in the middle with a North and South brow; the North is in one with the admiral's house on the N.W. extremity of the town, bearing E. 4° 30′ N. (*true*).

Sonnam. Sonnam is a small peak on the highest part of the near high land, on the south side of the bay, in one with Ras El Uswud and the Moosmaree reef, bears N. 80° E. (*true*). The Moosmaree is a breaking patch nearly 5 miles from the shore reef, and the same distance from the rocky bank, Marrueeah, bearing S.W. close to the West of Moosmaree; there is no bottom at 120 fathoms.

Mosque. There are many mosques or minarets, but the most conspicuous one in the centre of the town is the one used, and when in one with the flag-staff, bears N. 52° E. (*true*).

Flag-staff. The flag-staff is planted in the fort at the S.W. angle of the town. The fort forms in two octagons, in the northernmost of which stands the flag-staff; the other part is called the South Octagon, and the centre of it is on with the mosque when in the middle of the inner gateway off the Berry reef.

Eastern Tower. The Eastern Tower is a low white building on the S. E. extremity of the town wall, and is not much higher than it; when it is in one with the Sugar Loaf, it bears N. 72° E. (*true*).

## DESCRIPTION OF THE DANGERS, WITH THE MARKS FOR AVOIDING THEM.

Rocky Bank. THE westernmost, or Rocky Bank, is the outermost danger; its centre is 7 miles S. 74° W. (*true*) from the great mosque. It is 2 miles in extent, North and South, and East and West about three miles. There are five rocky patches on it, namely, Ulfogarnee, Abboolyahood, and Abboolhodere; they are in a line E. 24° S. (*true*), with channels from 9 to 17 fathoms between them. On the Ulfogarnee, the westernmost, there are 8 fathoms, on the centre one 2½, and on the easternmost 6 fathoms. The other two patches are the Aboo Nuckla and Ul

Wustarnee, which lie to the South of the other three nearly one mile, leaving a good channel between, with from 13 to 35 fathoms. On the first are $2\frac{1}{2}$ fathoms; on the latter, $1\frac{3}{4}$ fathoms in the hot season.

JIDDAH HILL, N. 81° E., or the mosque just open to the right of the Sugar Loaf, bearing N. 74° E. (*true*), leads across the bank between the patches.

The mosque just open to the North of the north brow of the Saddle, leads on the northernmost patches, but open to the south of it just clears them; or the Admiral's house on with the north brow of the Saddle, bearing N. 85° E. (*true*), leads just clear of the bank to the northward. Clearing Marks.

SADDLE HILL, N. 78° E. (*true*), or Sugar Loaf N. 69° E. (*true*), leads clear of the bank to the southward, and Oomarrar Hill, N. 31° E., clears it to the eastward. Oomarrar N. 30° E., or Moosmaree S. 30° W. (*true*) is the fair channel course to the eastward of the bank, and westward of the Marrueeah.

Marrueah. The first or outer cluster of reefs consists of breaking patches, except the MARRUEEAH, which is a sunken patch of $1\frac{1}{2}$ and 2 fathoms, distant half a mile N. 50° W. (*true*) from the centre of the largest of the breaking patches on the south part of this line, called the Shaabane; or it is S. 40° E. (*true*), upwards of $2\frac{1}{2}$ miles from the Ul Wustarnee above mentioned. The eastern side of this line of reefs is connected by many sunken patches to the second cluster. The northernmost patch of this range is called the Ghaham Reef, and from it the mosque bears N. 68° E. (*true*), distant $4\frac{1}{2}$ miles. The south extremities of this reef and of the second, stretch towards Ras Ul Uswud, and form the northern boundary of the south channel. There is also a channel between the Marrueeah $1\frac{1}{2}$ fathoms patch, and the breaking Shaabane reefs; and when Oomarrar bears N. 23° E. (*true*), steering for it will conduct between the patches and carry the vessel a little to the westward of the outer gateway in the second cluster of reefs. The mark to clear Ghaham, the north end of the first or outer line of reefs, is the Eastern Tower on with the Sugar Loaf. First or Outer cluster of Reefs.

The second or centre cluster of reefs, in which is the Outer Gateway, is more extensive than the former, and is also in patches, with many channels between them; but that preferred is through the Gateway. which is 270 yards broad, from which the flag-staff bears N. 58° E. (*true*) distant 3 miles. This Gateway is formed on the north side by the southernmost and largest of the Fellaha breaking shoals, with a sunken patch on its eastern end, with deep water between it and the large shoal, and on the south by dangerous sunken patches. When in the centre of this entrance a patch will bear (*true*) E. 40° S. distant 300 yards, which, with the other sunken patches on the south side, is to be avoided by passing along at about 100 yards from FELLAHA large breaking reef. After passing its south point, the course along it will be about N. 55° E. (*true*). Second or Centre Cluster of Reefs. Outer Gateway.

There is a channel between the northern extremity of this second cluster of reefs and the coast reef off Ras el Gahaize, and from thence to the South to the Inner Gateway. There is also a channel between the southern extremity of this second cluster of reefs, called Shab Marmood, and the coast reef off Ras el Uswud, and thence to the northward to the Inner Gateway. These two channels are constantly used by the buggalows: the *Benares* has been through them both. The entrance through the northern channel is similar to the Outer Gateway: that through the South channel is half a mile wide throughout; but there are overfalls in both.

MARKS for the SECOND or CENTRE LINE of REEFS.—For the Outer Gateway, is the Mosque on with the outer angle of the Flag-staff Tower. Sailing Marks.

For the South Channel, the North brow of the Saddle N. 71° E. (*true*) leads in clear of the south ends of the first and second clusters of reefs; and having rounded Shab Mahmood, steer N. 8° E. (*true*) for the Inner Gateway.

The third harbour, or inner cluster of reefs, in which is the Inner Gateway.

This has channels for buggalows and small boats towards its north and south ends, and in the centre of the reef is the inner or Double Gateway, as it may be called, for it is formed by four shoals, the two outermost of which are breaking reefs; that on the South is Abboo Harreet, and that on the north Beahree. Three hundred yards from them further in is Berry breaking reef, with a sunken patch off it on the northern side of the Gateway, and a sunken patch lies on the south side, both of which may be seen by a good look-out. This entrance is 250 yards wide, and the flag-staff bears from it N. 60° E. (*true*), it is the only entrance in the cluster for ships. When in the centre of the Inner Gateway there are two patches of 1 and 2 fathoms, in a line with the Eastern Tower, bearing N. 66° E. (*true*); the nearest is only 500 yards from the entrance, and is off the end of Berry, as already mentioned, and not more than 70 yards from it. The second is a rock of 1 fathom, half a mile, or 1,000 yards off; it lies off the eastern side of Berry, and the passage is between them, luffing round Berry reef to run up into the harbour; the distance between them is not above 400 yards. There is also a third small patch, bearing from the Gateway N. 61° E. (*true*), distant 1,200 yards; and a little to the North of this is a shoal 500 yards long, with 1 fathom on it. Third or Inner Cluster of Reefs.

The MARKS for the THIRD or HARBOUR REEF.—The flag-staff a little open North of the Minaret leads to the Inner Gateway. For clearing the Berry sunken patch, the flag-staff 20 yards, or half a ship's length, open to the North of the Minaret, or the Minaret and the centre of the south octagon in one; but the Sailing Marks.

Minaret must not be brought on with the southern extreme of the octagon, as that is on with the shoal that forms the southern part of the Gateway.

### BRIEF DIRECTIONS FOR APPROACHING AND ENTERING THE HARBOUR.

On approaching within 30 miles of JIDDAH, the Saddle Hill will be seen, if the weather is clear; when its north brow bears N. 81° E. (*true*) you will be off the harbour. In running up, get sight of the Moosmaree, but do not bring it to the westward of S. 7° W. (*true*) until you are sure of the above bearing of the Saddle. When the Mosque is on with the Sugar Loaf you may steer for them across the Rocky Bank between the shoals, which are easy to be seen. When clear of this bank, the course will be about East (*true*), 2 miles, which will take you to the GHAHAM breaking reef, and at 150 yards North of it, the Outer Gateway bears E. 4° S. (*true*), distant $1\frac{1}{4}$ miles. On approaching it keep the Fellaha breaking reef on board, to clear the patches on the south side of the channel, one of which bears E. 4° S. (*true*) from the entrance, distant only 300 yards; therefore, after passing the south point of Fellaha breaking reef, haul more to the northward to avoid them, but take care also to be clear of a sunken patch near the east end of Fellaha breaking reef. A true course N. 55° E. one mile should carry a ship along the large breaking reef, and the sunken patch off its east end, to the Inner Gateway. To avoid the patches within it, bear away to the eastward the moment you are within the narrow outer part of the Gateway, and the course will be about true N. 72° E., and bring the Flagstaff about 20 yards, or half a ship's length, open to the North of the Minaret before you reach the nearest shoal (the Berry sunken patch), keeping it on your larboard hand, and a sunken patch will be on your starboard hand, which forms the south side of the Channel of Berry. If the wind is at N.W., luff as close as you can with safety round the Berry sunken patch, close on the end of the Berry reef, as it is steep to and easy to be seen, and keep along the edge of the Berry reef to avoid the sunken rock 400 yards to the eastward of it, and the other two patches which are near the shore reef on the eastern side of the channel. But if the wind is southerly, the course up the harbour, after passing the Berry sunken patch, will be by compass about N.N.E., and ships may anchor with the Mosque from E. 12° N. to E. 12° S., in from $3\frac{1}{2}$ to 5, 6, and 7 fathoms. The latter bearing of the Mosque is where native ships always lie, and is the most convenient for boats going to the shore; but it is just to the North of the narrowest part of the harbour.

### EXTRA REMARKS.

If after getting off the Moosmaree reef you prefer passing within the outer rocky bank, refer to the description of that bank in the preceding account of it.

Or, if it be found convenient to go through the South Channel, or only through its entrance, for anchorage, see the description of the Second Cluster of reefs, and remarks at the end of it.

### TO PASS THROUGH THE NORTH TURRUCK, COOZERMERE CHANNEL.

Coozermere Channel.

The following directions are added for passing into the north of the second cluster of reefs, in case there should be a necessity for so doing; but there are alarming overfalls and patches in it, and a vessel would probably be longer in clearing the reefs by going that way than by going through the second Gateway.

Run in with the Mosque bearing S. 75° E. (*true*), or with JIBBEL WIDRI (a black conical hill to the left of Tennam Peak) on with the Admiral's house. Either of these marks will carry her in between GUTTAL OMUL HALLALA, DERGOEG, and RAS EL MUGGULAT REEFS. Having passed through these, haul a little to the South, about S. 50° E. (*true*), which will carry her through the Gateway formed by GUTTAL COOZERMERE and TOWWELAH reef towards ABOO HUMROON shoal; and when midway between the latter two, haul up about S. 18° E. (*true*), and keep a good look-out for a shoal patch, which should then be about half a point on the starboard bow, and which is in a line of S. 87° W. (*true*) from the great Mosque. Having passed this patch, steer true S. 8° E. for the Inner Gateway, and proceed in from thence, as already directed in coming from the southward.

### CONCLUSION.

When off the Harbour of Jiddah, if in want of a pilot, make the signal with one or more guns, as necessary, and they will come out. In running in they are mostly guided by the eye, for the channels are so narrow, that the marks will be found of little use, except in approaching the place; and towards noon is the best time for going in, as, owing to the transparency of the water, the sunken rocks then appear as a dark green shadow on the surface, but which rocks cannot be discovered until upon or close to them, when the sun is low to the eastward, and there is much glare, or in thick, hazy, or cloudy weather.

## CONTINUATION OF THE OUTER REEFS FROM LEET TO JIDDAH.

About $2\frac{1}{2}$ miles S.S.W. (*true*) of SHAB EL JEFFINE anchorage, and about S.W. 7 miles from Kishran anchorage, there are some rocky patches with deep water close to them. The GAD AMAZE is the outermost cluster of breaking reefs, upwards of 2 miles in extent, in latitude 20° 15′ N. They are about 16 miles S.W. by W. (*true*) from Marram; and between them and the north-western extremity of the extensive Outer reefs to the southward, there is an open channel leading in to the coast, towards Kishran and Leet. There are numerous shoals between Gad Amaze and Marram, and extending to the E.S. Eastward towards the coast at Merkat. The SHEDGER REEFS lie about 5 to 7 miles from the coast, with a channel between. *Gad Amaze.* *Shedger Reefs.*

Ten miles to the north-westward of these is the GUTTAH EL ABBOODOODA; and to the N.W. of it is the GUTTAH EL RUGGUAN and TOWEEL RUGGUAN, the last of which is a remarkable reef, two miles long, and the farthest from the shore, being 7 miles off; so that, like Gad Amaze, it may be frequently seen by vessels proceeding up or down the sea. *Guttah el Abboodooda and Guttah el Rugguan Reefs.*

The ABBOOSHOKE reefs are about 16 miles north-westward of Guttah el Abboodooda; and in this space, besides the Rugguan shoals just mentioned, are the BAHAIR, GUTTAH EL SHAYBAH, MUGGERADEEB, GUTTAH EL GOOFS, and MUSTUBBUD reefs and patches. Between the reefs in this space there are channels, but very difficult ones, and the shoals are so numerous, that they may be considered as forming a connected line of shoals, and ships ought not to attempt to cross them. *Abbooshoke Reefs. Bahair, Guttah el Shaybah, Muggeradeeb, Guttah el Goofs, and Mustubbud Reefs and Patches.*

At 11 and 13 miles farther is the GUTTAH GEEDAN and GUTTAH TUTTEFAH reef; and in this space is an open channel to the coast—the latter is only 4 miles off shore. *Guttah Geedan and Guttah Tuttefah Reefs.*

N.W., about 6 miles from Guttah Tuttefah reef, is the ULEUSSER ELYEMMARNEER, and in this space is an open channel to the coast. *Uleusser Elyemmarneer Reef.*

From Uleusser Elyemmarneer to Uleusser Shamier is about 4 miles N.N.W. (*true*), and to the northward of the latter, 2 miles, is a cluster of three or four, called Cobane. These are all breaking shoals, at five to nine miles from the shore, with deep channels between; the *Benares* having worked among them, and between them and the shore. *Uleusser Shamier and Cobane Reefs.*

N. by W., about 4 miles from Cobane, is a reef called URGO GORAB, with no bottom at 120 fathoms close to the westward of it; and $4\frac{1}{2}$ miles farther is another reef, called MOOSMAREE, lying nearly 5 miles westward of the Coast reef; there is no bottom at 120 fathoms close to the westward of it. These are both breaking reefs, and require particular attention when proceeding to or from Jiddah.

## THE INNER CHANNEL, FROM CAMARAN ISLAND TO LEET.

The Inner Channel, from Camaran to Leet, is bounded on the western side by numerous islands, rocks, and rocky patches, profusely scattered on and about the inner edge of the Outer Reef, and on the eastern side by the coast, which is bordered by a reef nearly throughout the whole extent, in which are several breaks, and some of them form secure anchorages.

The south end commences at Camaran, where it is only 700 yards wide between Camaran reef and Ras el Bayath, and is nearest to the latter; from thence its breadth increases to about 2 miles, until at the narrow part between Humreek Island and the Coast reef South of Loheia: the patches at 4 to 6 miles southward of Humreek may be passed on either side.

The channel from Loheia increases in breadth to 2 miles or more, until opposite RAS MUSSAHRIB, where it is rather less than two miles: the soundings are moderate, and will be best understood by looking at the chart. Passing Ras Mussahrib, it increases in breadth to 4 miles between Toag Island and the coast, and also within ASHIG ISLAND reef, beyond the north end of which it is 10 miles wide, and so continues until between DAHRET JAFFREE and the Coast reef, where the breadth is reduced to less than 5 miles, and further on to less than 4 miles, between Omel Currip and the Coast reef off Gheesan, and so continues as far as Ras Toorfah.

Between SHOORAH and the main the breadth of the channel is little more than 2 miles; but after passing THERAN, where its breadth is 7 miles, it increases to 10 and 12 miles, till abreast of ABOO LELF Island it is again contracted to 4 miles, between the south end of the reef extending from JESEERAL MOGID Island and a projecting reef from the shore; and 9 miles farther it is only $1\frac{1}{2}$ miles wide, between the north end of that reef and the reef off NAHOOD. Farther on, between the bank called OME KERGANE and the Coast reef between Nahood and Ernege, the channel is little more than a mile wide. The patch off the north end of that bank may be passed on either side, and a course steered to pass at $1\frac{1}{2}$ or 2 miles to the West of Halli point and Ras el Aboo Kalbe. Hereabout are some reefs nearly in mid-channel, which may be passed on either side, as most convenient, always observing to keep a good look-out. If it be deemed advisable to pass to the eastward of these reefs, it will be best to sail through Undareh Roads, as good anchorage will be found there, if

necessary. Having passed Undareh and Ras Abboo Mutnah, the best channel northward is between the Moolgamarree and Ummusseefah Islands and the main to abreast of Coomfidah ; or if more convenient to pass between these islands, care must be taken to avoid the rocky shoals in their vicinity.

At Coomfidah the channel is 8 miles broad, with 18 and 20 fathoms water. A course may be steered from abreast of Coomfidah, about N.W. $\frac{1}{4}$ N. (*true*), towards the south end of the Farrar Islands, observing that the inner edge of the Outer Reef to the southward of the islands is marked by rocks and rocky patches, with deep water close to. By passing near this edge, the patches lying about 3 miles to the south-eastward of the islands will be avoided. The Farrar and Cuffeel Islands mark the west edge of the channel, and may be passed at a moderate distance ; and, should it be necessary, good anchorage may be found at Dogar.

Having passed the CUFFEEL ISLANDS, reefs and rocky patches continue to mark the edge of the Outer Reef to abreast of Serrane Island, off the east end of which are two patches ; between these patches is the best channel, about one mile wide, and from thence, still by the edge of the reef about N.N.W. (*true*), to the S.E. end of JENNERBET, and the small island to the East of it. Beyond these begins an extensive reef, near the middle, forming two channels, that near the coast being about 400 yards wide, with 5 fathoms in it. This is considered to be the best ; but the western one is wider. Either may be used, as most convenient, according to the direction of the wind ; but a strict look-out for the shoal patches is absolutely necessary, particularly in the western channel.

Off Gillargin the channel is two miles broad ; and at this place good anchorage may be had, if necessary. From hence to Leet the coast is entirely bordered by a reef ; and there are several patches scattered about in mid-channel, leaving a clear space of only 2 miles between them and the Outer Reef. RAKER has a good anchorage, which may be taken if necessary. Directions for it, and also for Leet, will be found in page 320.

## THE COAST OF ARABIA FROM JIDDAH TO TIRAHN ISLAND, AND THENCE TO RAS MAHOMMED.

From Ras Gahaize the coast runs northward, about 11 miles to SHERM OUBHOOR, which runs in north-eastward 5 miles. At 4 miles North of the Ras the coast reef ceases, and the shore is bold, there being no bottom at 70 fathoms, within a mile of it. From Sherm Oubhoor the coast turns to N.W. and N.N.W. (*true*) 14 miles to RAS DAHLIMAR, and thence N. $\frac{3}{4}$ W. 6 miles to RAS HARTEBAH, in lat. 22° 0′ N. and longitude 39° 0′ E.

Eliza Shoals.

N.N.W. $\frac{1}{2}$ W. (*true*), 9 miles from Ras Gahaize, is the S.E. point of the Eliza Shoals, from whence the inner or eastern edge trends about N.N.W. $\frac{1}{2}$ W. and N.W. by N. about 21 miles to abreast of Ras Hartebah, forming the west side of a deep channel, of 2 to 3 miles wide, between it and the coast. From 5 to 6 miles about W.S.W. (*true*) from Ras Hartebah, and on the inner edge of these shoals, is a large patch of reefs and deep water, called GUTTAH DEGAIZE. About 10 miles W.S.W. westerly from the S.E. point, is the S.W. point of this extensive bank, in latitude 21° 37$\frac{1}{2}$′ N., and bearing W.N.W. (*true*) 15 miles from Ras Gahaize. About 3 miles N.W. from this point, and on the western edge, is a reef about 3 miles in length in the same direction, called SHAB UL KEBEER, with no bottom at 70 fathoms close to its west side. All the S.W. and south part of these shoals have breaking rocky reefs, with deep water close to them. Reefs and shallow patches extend also to the N. by W. from Shab ul Kebeer, and about N.W. by N., 11 or 12 miles from it, also on the edge of the bank, is another reef, in a north and south direction, called ABOO FARHRAMISH, near which is good anchorage, in lat. about 21° 52′ N.

Guttah Degaize.

Shab ul Kebeer.

Aboo Farhramish.

From hence the west edge of the shoal takes a north direction to its N.W. point, where there is a reef called ABOO MURDAFER, where there is good anchorage, sheltered from N.W. winds. This is the northern Eliza Reef ; its west end is in latitude 22° 2′ N., and longitude 38° 48′ E., from whence it extends 3 or 4 miles in a N.E. by E. $\frac{1}{2}$ E. (*true*) direction, in a narrow line.

Aboo Murdafer, or northern Eliza Reef.

Inner Channel between the Eliza Reefs and shore. Anchorage.

A ship from the northward, if a good look-out be kept, may with safety take advantage of the Inner Channel already mentioned, between the Eliza Reefs and the low sandy coast fronting them, it being from 2 to 3 miles wide, with no bottom at 60 and 70 fathoms, and both sides bold to. Should night come on before a ship is through this channel, she may haul a little to the westward, and anchor as most convenient under the lee of any of the reefs, keeping in mind that the range of reefs which form the west side of this channel, where anchorage may be had, terminate in latitude 21° 46′ N., when two remarkable hills with peaks on them, called the Sisters, which form the northernmost high land near the coast, bear about E. or E. by S. To the southward of this, 6 miles, are only a few patches, which do not afford good anchorage from N.W. winds. The northern entrance to this channel lies close to the west end of the northern Eliza Reefs, ABOO MURDAFER. A course S. 65° E. 8 (*true*) miles, with soundings from 20 to 40 fathoms, will lead into the channel ; when you have no soundings, a course may be thus steered close along shore, to the reefs of Jiddah. In passing close along the coast, the Inlet, called in the old charts Charles River, but by the Arabs, Sherm Oubhoor, will be observed, which is in an extensive inlet of the sea. The entrance is narrow, and so it continues some distance up, with soundings from 18 to 25 fathoms in it, and then widens into some beautiful bays : but it would not be prudent to anchor here, it being difficult to quit with a light land-wind, if there is any swell at the entrance, which is generally the case after hard N.W. winds. In other respects, vessels may lie quite land-locked

Sherm Oubhoor.

inside, with scarcely space to swing, except in the upper part, which is distant from Jiddah Mosque 14 miles.

From Ras Hartebah the coast trends N.N.E. ½ E. 21 miles to RAS MALUK, a low sandy point, forming between them various Merzas of considerable extent, but difficult to approach, on account of the numerous reefs and shoals with which all this part of the coast is bordered, extending from 6 to 8 miles from shore; there are, however, some channels among them. A channel lies close to the west side of HEYGA, a low sandy island, which is 3 miles N. by E. (*true*) of Ras Hartebah, and it leads out again into a large channel 5 miles to the northward of HARAMIL, which is a similar low island, where these reefs terminate, at 9 miles to the westward of Ras Mahluk. Haramil Island is low and sandy, and covered with bushes, in latitude 22° 15′ N., lon. 39° 3′ E.

About 5 miles N. by W. (*true*) from Ras Mahluk, is RAS UL KHOORMAH, also low and sandy, forming on its south side a bight in the coast full of shoals: and about 3 miles to the North of it, the coast reef which began at Ras Dahlimar terminates. From Ras ul Khoormah about 12 miles N. ¼ W. (*true*) is MERZA DENEB, where good anchorage may be had in 7 to 10 fathoms. From hence the coast takes a N.W. by N. direction, and at the distance of 8 miles is SHERM RHABUC. All this part of the coast is a low sandy desert. Merza Deneb.

N. 20° E. from the west end of the Northern Eliza Reef, at the distance of 19 miles, and N. 59° W. (*true*), from Haramil I. 8 miles, in lat. 22° 19′ N., and lon. 38° 55′ E., is the south end of a large reef called SHAB NAZER, on the N.E. side of which there is indifferent anchorage. From this reef, N. 19° E. (*true*), to the distance of 23 miles, numerous reefs exist on a bank of soundings, with passages and anchorages among them: their western edge preserves nearly a straight line, and there is no bottom at 40 or 50 fathoms outside them. This bank of reefs is from 2 to 5 miles broad, and a little to the westward of their northern end, in lat. 22° 38′ N., and long. 38° 58′ E., lies a large reef called ABOO SAHAIN, under which there is good anchorage from N.W. winds. The S.E. part of this bank of reefs is about 1½ miles from the N.W. part of the reef; West of Ras Mahluk, but off Ras ul Khoormah, the channel is 5 miles wide, decreasing again to 1¼ miles, as Sherm Rhabuc is approached. There is a rocky shoal about mid-channel, off Ras ul Khoormah, but in all other parts no bottom at 40 and 50 fathoms. There is also a patch about 2 miles to the S.E. of Shab Nazar. Shab Nazer Reef. Aboo Sahain.

SHERM RHABUC, in lat. 22° 23½′ N., and lon. 39° 4′ E., is a capacious inlet, affording excellent anchorage inside its entrance in 8 to 12 fathoms, perfectly sheltered from all winds, and easy of ingress and egress when N.W. winds are blowing. This is a sacred spot to Mussulmen pilgrims, who here disrobe and put on the white garb of pilgrims. Sherm Rhabuc.

At this point of Rhabuc, wood, water, and other supplies may be obtained at a cheap rate, but the Bedouin Arabs are not to be implicitly trusted. An extensive date grove and several villages are situated about 5 miles, inland. In the interior of the country there is a range of mountains, of which the most conspicuous and nearest is a double bluff hill with precipitous sides, called Jibbel Rahab: it is in lat. 22° 32′ 30″ N., and lon. 39° 29′ 30″ E. Jibbel Rahab.

West from Sherm Rhabuc about 10 miles is the east end of a large reef, about 3 miles in extent N.W. by W., called SHAB UL ABBEAT, with no bottom at 30 and 40 fathoms near it; and 9 miles W.N.W. (*true*), from the N.W. end of this reef are 4 small shoals lying close together, called SHAB COMSAH; they are in lat. 22° 47′ N., and lon. 38° 42′ E., and there is no bottom at 40 fathoms close to the eastward of them. At 3 miles E. by N. from them is a rocky patch, with no bottom at 50 fathoms near it. Shab ul Abbeat. Shab Comsah.

From Sherm Rhabuc 15 miles N.W. by W. is SHERM UL KHURRAR, and here again begins the coast reef; and 8 miles further N.N.W. is a low sandy point called Ras Mustoorah. Ras Delaidelah is about 5 miles from Ras Mustoorah in the same direction, the coast between forming a bight, in which is an island on a reef, and many rocky patches; there is also a bight full of rocks to the northward of this Ras. From Ras Delaidelah 14 miles N.N.W. (*true*), is Ras ul Kheehum, and 13 miles further in a N.N.W. ½ W. direction is a low sandy point called Ras Abbiat, the coast throughout the whole extent bordered by a coral reef, with shoal water and rocky patches, running off from 4 to 7 miles from shore, and no bottom at 30 fathoms close outside. Sherm ul Khurrar.

North from Shab Comsah in latitude 23° 2½′ N., lies a small reef, on the west side of a bank of soundings of 15 to 25 fathoms; this is the outer reef of a large cluster called GUTTAH UL KHURRAR, which lies to the eastward of 31° 41′ E. lon. There are passages and anchorages among these reefs, also a safe channel near the shore, with no bottom at 30 and 40 fathoms. The outer boundary of the Khurrar Reefs lies 9, 10, and 11 miles from the main land, which is low near the sea; they extend from lat. 22° 48′ to lat. 23° 5½′ N. Guttah ul Khurrar.

About 5 miles N.N.W. (*true*) from Ras Abbiat is SHERM BRAICKHAH, running nearly 3 miles inland E.N.E., at the head of which are the ruins of a fortified town. Here is good anchorage for small vessels, and stock is procurable, but the natives are not to be trusted; in fact the whole tract of coast from Ras Hartebah to this place is inhabited by the Hurrub Bedouins, a tribe whose character is proverbial throughout the sea for ferocity and treachery, so that it is dangerous to land upon it. Sherm Braickhah.

N.W. ¼ N. (*true*), 38 miles from Sherm Braickhah is the entrance to Yembo, the coast between bending in a little, and bordered throughout with a coral reef. At the distance of 6 miles from the former is RAS

Ras Madges. ATTIAH, and 8 miles further RAS MADGES, to the southward of which is good anchorage, in a bight of the coast reef.

North from the outer Khurrar reef are the numerous shore reefs before mentioned; a N.N.W. line from the outer Khurrar reef leads from 3 to 6 miles to the westward of these reefs, to latitude 23° 27′ N., and longitude 38° 28′ E., in which situation there is a small reef, the southern one of a group extending 18 miles to the northward, to latitude 23° 45′ N.; they have soundings and indifferent anchorage among them, but no soundings on their outside. Their inner edge is from 2 to 3 miles off the coast reef, and their N.W. extremity extends to longitude 38° 21′ E. full 11 miles W. by S. (*true*) from Ras Attiah. About 3 miles W.S.W. from Ras Abbiat is a reef with 7 fathoms on it, and no bottom at 40 and 50 fathoms near to it.

Shab Suflamy. About 17 miles westward of Ras Abbiat, in lat. 23° 30′ N. and lon. 38° 18′ E., is the S.E. end of a large reef called SHAB SUFLAMY, extending thence 3 miles N.N.W. (*true*), having no bottom at 100 fathoms close to the southward. Jibbel Soubah bears from it S. 75° E. (*true*), distant 46 miles.

Jibbel Soubah. JIBBEL SOUBAH is a remarkably high mountain near the sea, of about 4,500 feet elevation, and higher than any other hills between Jiddah and Yembo; it can be seen at the distance of 40 miles. The upper part forms a convex line, with two small peaks near the centre; it is in lat. 23° 18′ N., and lon. 39° 8′ E. A range of very high land extends some distance to the N.N. Eastward of Soubah, and has several remarkable peaks on it; but these are seldom seen far at sea, unless the atmosphere is very clear.

Thetis Reef. About N.W. by W. (*true*) 13 miles from the last-mentioned reef, Shab Suflamy, and 27 miles southward of Yembo, in latitude 23° 38′ N., and longitude 38° 6′ E., is the Thetis Reef, a small and dangerous reef, having no bottom at 120 fathoms very near to it. This reef was discovered in the Honourable Company's cruiser *Thetis*, in 1829.

Shab Subbah, or Seven Reefs. About 7 miles N. by W. ½ W. (*true*) from the Thetis Reef is the south-easternmost of a cluster of shoals, called SHAB SUBBAH, or the Seven Reefs, in latitude 23° 45′ N.; they thence extend about 9 miles N.W. by N. to latitude 23° 53′ N., and are about 2 miles wide, their western boundary being in longitude 37° 58′ E. These are the most dangerous reefs on this part of the coast, as they lie so far from the land, and there is no bottom at 100 fathoms at a short distance to the westward of them.

Guprear Reef. Besides these there are several reefs and rocky patches lying from 5 to 9 miles off shore, between Ras Madges and Yembo, with deep water between them. The outermost of these is in latitude 23° 50′ N., longitude 38° 13′ E. The northernmost called GUPREAR is in latitude 24° 2′ N., longitude 38° 2½′ E., and bears from Yembo entrance S. 52° W. (*true*) 5½ miles: there is good anchorage in N.W. winds at this reef. Four miles to the westward of Guprear is another small reef, and W.N.W. (*true*) 6½ miles from Guprear is another with 7 fathoms near, and no bottom at 70 fathoms to the eastward of it. Another small reef lies S. by W. about 3 miles from Yembo.

These are the only dangers in approaching Yembo, and they are easily avoided; by a good look-out, a vessel may stand close to them without fear.

Yembo. YEMBO, the Port of Medina, is governed by a Turkish Effendi, and garrisoned by a few troops from Egypt. It is situated on a low sandy shore, and on the northern side of a capacious inlet of the sea. The entrance of the harbour lies in latitude 24° 4′ 30″ N., and longitude 38° 6′ E.

The high houses and mosque can be seen 13 miles distant, and the approach to it is not dangerous; there are no soundings close to the entrance, which is 300 yards across, and a vessel can only enter with a fair wind. A patch of rocks bounds the southern side of the entrance, and extends a little distance to the N.W. on which the N.W. swell breaks very heavily, making the harbour difficult to quit when N.W. winds have been blowing; and the land wind in the morning is scarcely sufficient to carry a vessel out against the swell. This endangers a vessel being drifted on the rocks, should the land wind fail and the boats be unable to tow the vessel against the swell. This was the case with the Honourable Company's surveying brig *Palinurus*, and she narrowly escaped being wrecked. After entering the inlet it widens considerably, and forms a capacious harbour, with 4 to 6 fathoms in it; there is a conspicuous white tomb in the low sandy point forming the northern side of the harbour, and there is a small sandy island, covered with bushes, having a sheik's tomb near its east end, on the broad bank of the reef forming the south side. There is a remarkable range of high table mountains to

Rudduah Mountains. the N.E. of Yembo, called the RUDDUAH MOUNTAINS, which are by measurement 6,000 feet high; the N.W. brow bears from Yembo N. 18° E. (*true*) distant 31 miles; the S.E. brow N. 23° 44′ E. distant 31½ miles. Yembo affords a good and cheap supply of excellent fresh water, which is kept in covered or vaulted tanks, in and near the town; its price about 300 gallons for one dollar. Wood is scarce; sheep in abundance, at 1½ dollars each; a few bullocks, fowls, fruit, and vegetables are to be obtained. The only dangers on approaching Yembo have already been described.

Sherm Yembo. SHERM YEMBO, a capacious harbour and inlet of the sea, N. 53° W. (*true*) from the port of Yembo; the entrance lies in latitude 24° 9′ N., and longitude 37° 59′ E. It is a safe and commodious harbour, being easy of ingress and egress for the largest ship; the soundings are from 20 fathoms at its entrance, decreasing to 10

and 8 fathoms a little way in, from whence it branches off in several arms, the northern one to the distance of five miles inland. The coast about Sherm Yembo is a low, sandy shore, and clear of dangers, having no soundings till near CAPE BAREEDY, off which, distant 8 miles S. 47° E. are several reefs, with anchorages and passages between them. Soundings from 13 to 25 fathoms extend to the south-eastward of these reefs; the land opposite forms a deep bay. There are no soundings any distance to the westward of the reef off Bareedy, and none at Cape Bareedy, 100 yards from the narrow reef bounding the shore.

CAPE BAREEDY is a moderately elevated promontory, forming a convex curve to the westward, about seven miles in breadth. Several points form on this cape, all having different names by the natives, I shall therefore take the centre and most southern part of this promontory for Cape Bareedy, which lies in latitude 24° 16′ N. and longitude 37° 38′ E.; the face of the shore is bounded by steep cliffs, and there are no soundings close to them. The dangers to the south-eastward have been described; there are none to the south-westward or West. Inland to the North and north-eastward of Cape Bareedy there is a remarkable range of broken hills, of moderate elevation; the northern and western one, called Sugar-Loaf, bears from Bareedy N. 1° W. distant 17 miles; the southern and eastern one, called Scragged Hill, bears from Bareedy N. 30° E. (*true*) distant 16½ miles: these are very conspicuous hills when nearing the coast, and are seen under the high land to the north-eastward of them, which range of mountains extend from Yembo to Hassanee Island. In the centre of this high land is one more elevated and conspicuous than the rest, called Round Mountain; it is in lat. 24° 43′ N. and lon. 38° 0′ E.; the northern part of the high land is nearly abreast of Hassanee Island. Cape Bareedy. Sugar Loaf. Scragged Hill. Round Mountain.

The first danger to the northward of Cape Bareedy is a small reef, called SHAB GRUSHE, or Shark Reef; it bears from Bareedy N. 63° W. (*true*), distant 13 miles, lies 4 miles from the coast, and is the southern one of a group, which extends 4 or 5 miles from the coast to the northward, and among which there is indifferent anchorage. Shab Grushe.

To the W.N.W. (*true*) of Shab Grushe, or Shark Reef, distant about 13½ miles, lie the PALINURUS Reefs, called by the natives SHAB SHAYBAH; these are a group of small reefs, of 4 or 5 miles in extent, having no soundings or anchorages near them. Being the outer reefs and situated fourteen or fifteen miles from the land, they are dangerous for a ship to approach in the night: the centre and western one lies in latitude 24° 26′ 30″ N., and longitude 37° 12′ E.; from this the northern reef bears N. by W. 2½ miles, the southern one S.S.E. 3 miles. On the southern end of the large reef, which lies to the eastward 4 miles, there is a rock above water, about the size of a ship's capstan. A good mark for these reefs is Scragged Hill, on with the north brow of the Rudduah Mountains. Palinurus Reefs, or Shab Shaybah.

North from the centre of the Palinurus Reefs, to the distance of 9½ and 12½ miles, in latitude 24° 38′ N. are four small shoals, with sunken rocks close about them; there are no soundings to the westward of these reefs.

In lat. 24° 44′ N. and longitude 37° 12′ E. is the centre of a group of large and small Reefs, extending 2½ miles to the north-westward, and 2½ miles to the south-eastward, on a bank of sunken rocks and soundings, about 1½ miles broad; indifferent anchorage for a small vessel may be found under these reefs; they are named by the Arabs Aboomutarah, and lie 4 miles West from the shore, forming a point called Ras Mahar; there are no soundings to the westward of these reefs. Aboomutarah.

SHERM MAHAR is a good anchorage, in a bay on the coast, E. by S. (*true*) 6 miles from the South of Aboomutarah Reefs; this place is capable of affording shelter to any ship from N.W. winds; you anchor in 7 fathoms sand. Moderately elevated table hills approach close to the sea, a remarkable gap in them forming a deep valley points out the anchorage, which lies in latitude 24° 41′ N., and longitude 37° 20′ E. Sheep are to be obtained from the Bedouins, but water is scarce. There is another anchorage on the coast, 4 miles to the S.E., called Sherm Hussay, but it is indifferent on account of its being so contracted, the depth of water great, and bottom foul. Sherm Mahar. Sherm Hussay.

SHAB MOMBARRACK is a small shoal, with anchorage on its south-east side; it lies N. 56° W. (*true*) distant 4 miles from the centre of the Aboomutarah Reefs; this is the outer danger, till approaching Hassanee Island, which lies North from this, distant 12 miles. Shab Mombarrack.

HASSANEE ISLAND, the centre or high part of which is in latitude 24° 58′ 15″ N. and longitude 37° 9′ E., is 4 miles in length, N.W. and S.E., and about 2 miles broad; the island is 400 feet high at the centre and northern end, but slopes gradually down to a low point on its South, and it can be seen from the deck of a ship 25 miles in clear weather. It lies 10 miles from the coast, which here forms a deep bay to the eastward, in which are several reefs and two small islands. There is spacious anchorage near the south-east of the island, in 10 or 15 fathoms; but care must be observed not to haul too close round the S.W. side, as there is an extensive reef and sunken rocks, running off from the S.W. point to the S.E., to the distance of 1½ miles. The best anchorage is round the S.E. point, close to a large Arab village, which is inhabited some months in the year by the people from the mainland. The anchorage abreast the village affords shelter from all winds. A scanty supply of sheep, wood, and water, can be obtained from the natives who bring it from Hassanee Island. Good Anchorages.

the main, which is here rich in pasture and dates; but caution ought to be observed in transactions with the natives.

Dangers to the westward of Hassanee Island. Libnah Island.

S. 48° W. (*true*), distance $6\frac{1}{2}$ miles from the centre of Hassanee Island, is a small reef, having no soundings near it: N. 72° W. (*true*), distant 8 miles, is another small reef; these are the outer reefs from the island, others lie to the eastward, between the latter reef and the island, where anchorage may be had. There is a small rocky island of 300 feet elevation, half a mile distant from the N.W. end of Hassanee, called LIBNAH Island, having a channel between it and Hassanee, only to be used by boats. To the N.W. of Hassanee, distant 4 miles, a long reef is connected with the north end of the island. This extensive reef reaches in broken patches, rocks, and sand-banks, to the distance of 15 miles to the N. N. E., having narrow and dangerous channels between them.

A line N. 40° W. (*true*) from the centre of Hassanee to latitude 25° 23′ 30″ N. reaches the south end of the reef, which extends 14 miles to the south-eastward of the low coral island of Mushabeah; this line just touches the western boundary or other reefs, consisting of several small but dangerous reefs, situated between Hassanee and the long reef off Mushabeah. Inside of these reefs a ship ought on no account to venture; they have no soundings near them, and lie 15 miles from the coast, which, in this part, is pointed by numerous coral islands and reefs.

Shaybarah Island.

In latitude 25° 23′ 45″, and longitude 36° 44′ 15″ E., is the south end of the extensive reef just mentioned, connected with Mushabeah Island: it lies S. 34° E. (*true*) distant 14 miles from the south point of the island, forming a concave curve to the eastward; there are no dangers or soundings to the westward of the reef. Easterly, 9 miles from the point of this reef, lies the island of Shaybarah, which is a low, sandy, and coral island, having numerous bushes on it; the length of it from N.W. to S.E. is about 6 miles, and 3 miles broad. Between this island and the south point of the reef just mentioned is a broad channel which leads into a gap among the inner reefs; from thence among the reefs to the northward. This channel is used by all the native boats, but is much too narrow and dangerous for a ship, although the Honourable Company's surveying brig *Palinurus* passed through it twice. There is good anchorage throughout this channel.

Mushabeah Island.

MUSHABEAH Island, (the northern and western end in latitude 25° 40′ N., and longitude 36° 33′ E.,) is a low and level coral island from 18 to 20 feet high, $4\frac{1}{2}$ miles in length, north-west and south-east, and $1\frac{1}{2}$ miles broad: its western side is quite steep, having no soundings at 120 fathoms close to the cliffs; there are no dangers to the westward of it. The reef extending off the south end has a gap in it, distant about 2 miles from the island. In this gap of the reef a vessel may anchor, but the bottom is very foul. From the N.W. end of Mushabeah N. 16° E. (*true*) to latitude 25° $53\frac{1}{2}$′ N., which is the latitude of the northern isle of this group, a low coral island with excellent anchorage close to the southward of it, is called SHEIKH MURBUT: it contains the remains of a Mussulman saint of that name, deposited in a now ruinous tomb. This island or anchorage is safe to approach; a bank of soundings from 50 to 30 fathoms extends to the westward of it five or six miles, as well as 12 and 13 miles to the N. N. W., joining the rocky or broken cliff island of Murdounah.

Sheikh Murbut.

Ras Ghurkoomah.

CAPE GHURKOOMAH is the nearest point of the main land, situated 4 or 5 miles E.S.E. (*true*) from Sheikh Murbat; it is 400 feet high, and the Cape gradually rises in the centre.

Murdounah Island.

From Sheikh Murbat Island, the next island is MURDOUNAH, about 150 or 200 feet high, in broken coral cliffs; it is about 3 quarters of a mile long, N.N.W. and S.S.E., in some places only 100 or 50 feet wide; it lies in latitude 26° 4′ N., and longitude 36° 33′ E., or North from Mushabeah. A bank of sandy soundings extends to the S.S.W. (*true*) of the island 7 miles, but not far to the westward. Anchorage close to a reef off its south end affords shelter from N.W. winds; but better anchorage is obtained by proceeding to the main land, which lies five miles to the eastward, forming a point; close to the northward of which is SHERM ABBAN, a fine bay, and good anchorage. The land from this point runs to the eastward, four or five miles, and affords good shelter and anchorage from N.W. winds; the soundings are from 30 to 15 fathoms near the shore, which is low and sandy; the beach in some parts is pointed by low coral cliffs. Excellent water and sheep in plenty, also fire-wood may be obtained at this or the former anchorage: the Bedouin Arabs supply the articles at a cheap rate; water at about 200 gallons for a dollar; sheep are one, and one and a half dollars each. From this anchorage the land forms a bay to the southward, in the centre of which there is a large reef, and soundings all about it, from 25 to 10 fathoms. There is a safe passage between Murdounah Island and the main, which leads up to the port and harbour of Wedge, or Ul Waish.

Good Anchorage.

Supplies.

Riackah Island.

N. 40° W. (*true*) from Murdounah, distant 9 miles, is the island of RIACKAH; this island rises gradually from its south end to about fifty feet, in the middle and north end. An extensive reef and patches extend to the southward, to within two miles of Murdounah Island. There are no dangers to the north-westward of Riackah Island, which is safe to approach, should a ship wish to get into the port of Wedge.

Sherm Wedge.

Anchorage.

SHERM WEDGE, or the port of that name, is a small bay on the coast, capable of affording good anchorage in $3\frac{1}{2}$ to 6 fathoms, for a small or middle-sized ship: the bay forms three sides of a square; the entrance 250 yards broad. A ship ought to anchor close inside the northern point, as the water is shoaler a little way

up the bay; she will then be just clear of the N.W. swell, which rolls across the entrance; the ground is stiff clay. This place is easy of ingress and egress, and no dangers lie out to seaward; the island of Riackah lying to the W.S.W. (*true*) 5½ miles, may be boldly approached, and it will lead a ship into Wedge. The coast about Wedge is coral cliffs about 50 to 70 feet high; the port is not easily distinguished till close to it. It lies in lat. 26° 13′ N., and lon. 36° 32′ E., or 2° 10′ East of Cosire, by numerous chronometric measurements.

Wedge affords a good and cheap supply of excellent water, obtained from the Bedouins, who charge one-twentieth part of a dollar for two skins, containing about five gallons each skin, or about 200 gallons per dollar. They can supply 2,000 gallons a-day, brought from some wells distant six miles inland, where there is a Turkish garrison of 25 men, in a small fort used as a depôt for grain required by the caravans going to Mecca. Sheep may be obtained at one, or one and a half dollars a-head. Should a large ship require water at Wedge, and not like the anchorage, she may anchor to the southward of the reef extending or connected with the south end of Riackah Island, distant four or five miles from Wedge, at which place boats can be procured to bring water. Anchorage for large ships to water at.

The Arabs at Wedge are civil, and under the chief of the Billy tribe, named Sheikh Amarah; he generally resides near Wedge, and expects a small present. A number of fishermen also reside here, belonging to that extraordinary race, the Hootaimy, so well described in Lieutenant Welsted's narrative of these seas.

N. 2° W. (*true*) from Wedge, distant 20½ miles, or in lat. 26° 34′ 18″ N., and lon. 36° 33′ E., is a conspicuous mountain called JIBBEL ANTAR, or Jibbel Leban, having on its centre two small peaks, whose summits are 2,500 or 3,000 feet above the level of the sea. This mountain is eight miles from the sea coast, and can be easily and frequently distinguished at sea. Jibbel Antar, or Leban.

RIACKAH ISLAND, the centre of which lies in lat. 26° 10¼′ N., and lon. 36° 26′ 15″ E., is W.S.W. (*true*) 5½ miles from Wedge. A line drawn from this, N. 35° W., to lat. 26° 57′ N., clears the western or outer boundary of several patches of reefs, lying in groups, and extending from five to eight miles from the main land, with channels and anchorages among them. No vessel ought to venture inside the line, which runs close to the reefs, unless she may require to anchor, which few navigators, not accustomed to anchor among reefs and sunken rocks, would be bold enough to do, unless they had a native pilot on board. The coast, 11 miles to the N.W. of Wedge, is clear of reefs. Two small low sandy islands, covered with bushes, lie on some of the reefs to the westward; the southern one, AHWHENDEAR Island, in lat. 26° 36′ N., and lon. 36° 10′ 30″ E.; the northern one, Naboogier Island, in lat. 26° 43′ 30″ N., and lon. 36° 6′ E. The northern shoal of the group lies, as mentioned formerly, in lat. 26° 57′ N., and due South eight miles from the south end of Namahu Island, or in lon. 35° 50′ 30″ E. Between this shoal and the island the coast is clear, and soundings extend a mile off shore, where a ship in moderate weather may anchor. Ahwhendear Island. Naboogier Island.

From Wedge to Namahu Island the coast has several small indentations, and a number of low hills extend close down to the coral cliffs which line the shore. There are two small bays, called Sherm Antar and Sherm Demerah, to the East and E.N.E. (*true*) of Ahwhendear Island, distant six and a half miles. Sherm Demerah, the northern one, is the best anchorage. Sherms Antar and Demerah.

NAMAHU Island is three and a half miles long, N.N.W. and S.S.E., and one mile broad; it is low and sandy at the northern end, rising gradually to the south end to about 400 feet in broken and abrupt lime-stone cliffs and hills; the south end lies in lat. 27° 4′ N., and lon. 35° 50′ 30″ E., and is distant from the main land about 1½ miles, forming a safe channel, and affording two safe anchorages, in 6 or 7 fathoms on the east side of the island, in small bays; one to the North and the other near its centre. Abreast the south end of the island there is also anchorage near the main land in 6 and 7 fathoms, under a low woody point; the latter is most convenient for ships taking shelter from strong north-westerly winds. A long reef joins and extends from the N.W. end of the island 4½ miles; there are no soundings near it. The natives on the main are civil, and bring sheep and water; but Europeans ought to be cautious not to go far inland. Namahu Island. Safe Anchorages. Supplies.

From the latitude and longitude of Namahu Island, as mentioned, a line drawn N. 37° 30′ W. (*true*) to Ioubah Island, in latitude 27° 45′ 30″ N., clears the outer boundary of the reefs off shore. The first group lies between lat. 27° 15′ N., and 27° 18′ N., and 1½ miles to the East of the above-named N.W. line: the second group lies between 27° 25′ 30″ N. and 27° 34′ N., and from 2 to 5 miles East of the line. The next group is about 6 miles in extent N.W. and S.E., and very narrow, in which lie several low coral islands, called the Sillah Islands; they are between the parallels of lat. 27° 37′ N. and 27° 42′ N., lying close to the supposed N.W. line. Between these shoals, and also between them and the shore, the channels are clear; but a ship would do well not to go in-shore of them, as there is no bottom near the coast, and the reefs have no soundings close to their western sides, though with light winds a vessel might anchor among them, with the exception of the Sillah Islands and Reefs. Sillah Islands.

East, distant 12 miles from Sillah Islands, is the village and small fortress of MOILAH, which lies in latitude 27° 40′ N., and longitude 35° 33′ E.; this is another station as a depôt for grain for Mussulmen pilgrims. A small garrison of Turkish soldiers, under Mohammed Ali Pasha, protects the place: a Bedouin chief being the nominal proprietor of this place, supplies are only to be obtained from him, and his men are Moilah.

not to be trusted. The place affords excellent water and sheep: but the anchorage is unfit either for ships or boats; besides, there are numerous dangers between it and the Sillah Islands. Should a vessel require water, supplies, or shelter, &c., she can run into an inlet called SHERM YARHOUR, 4 miles to the S.E. of Moilah; though the entrance is narrow, there is room enough inside, and it is beautifully sheltered; the approach to it from the westward is open between Sillah Islands and the second group of reefs, as before mentioned. At Yarhour the Bedouins bring fire-wood, water, and sheep, at a moderate price.

Sherm Yarhour. Supplies.

Sherm Jibber.

SHERM JIBBER, an inlet in latitude 27° 33′ N., and longitude 35° 37′ 30″ E., affords good anchorage, but the entrance is narrow.

E. 10° S. (*true*) from the fort of Moilah is a remarkable sharp-pointed hill, called Moilah High Peak, 9,000 feet high: it has a very grotesque appearance, and is at the S.E. entrance of an immense range of high mountains, extending to the northward. Moilah High Peak is in latitude 27° 36′ 40″ N., and longitude 35° 50′ E. The mountains hereabouts approach nearer the sea than in general, and the land between them affords plenty of fire-wood, and grazing for sheep.

Ioubah Island.

IOUBAH ISLAND, the north end in latitude 27° 46′ 20″ N., and longitude 35° 13′ E., is $1\frac{1}{2}$ miles in length N.W. and S.E., the north end being a precipitous cliff 300 or 400 feet high, sloping gradually to the S.E. end; there are no soundings or anchorage near this island. Two low small coral islands lie to the East of Ioubah, from 3 to 2 miles; a small reef also, 1 mile S.E. (*true*) from the south end of Ioubah, another N.N.W. (*true*) $2\frac{1}{2}$ miles from the north end of the island, having no soundings near them.

To the northward of Ioubah about 17 miles, the Arabian coast takes a direction nearly due West, the peninsula of SINAI leaving an opening of 10 miles to the Gulf of Akabah, nearly in the mouth of which gulf lies the high and large island of TIRAHN. The coast is fronted by numerous reefs, unfit for anchorage, bounding the coast; and to the southward of it lie in succession from the East, the islands of Burrahghan, Shooshooah, Senaffer, and Tirahn.

Burrahghan Island.

BURRAHGHAN, the south end, lies N. 25° W. (*true*), distant $6\frac{3}{4}$ miles from the north end of Ioubah, or in lat. 27° 52′ 15″ N., and lon. 35° 8′ 30″ E. It is $1\frac{1}{2}$ miles long, greatly indented, with small bays in broken coral cliffs or hills, about 100 feet high. There is good anchorage on sandy bottom close to the S.E. end of the island, well sheltered from N.W. winds; off the N.W. end there are some patches of sunken rocks, but the western and southern sides are safe to approach.

Shooshooah Island.

W. by N. (*true*), 9 miles from Burrahghan, lies the island of SHOOSHOOAH, a small island shaped like a quoin, being about 200 feet high, forming a precipitous cliff on the south face, close to which there are no soundings; but on the east side of the island a small reef projects out, off which soundings extend a short distance, on which a vessel, upon an emergency, may anchor in 7 or 8 fathoms, on rocky and sandy ground.*

Senaffer Island.

Senaffer is the next island to the West. This is rather a large island of a semicircular form, opening into a fine bay to the southward, in which there is excellent anchorage in 7 or 8 fathoms, sandy bottom; the anchorage is open to southerly winds. Soundings of 15 and 25 fathoms extend to the southward of the island. Numerous broken peaked limestone hills cover the eastern part of the island; the highest one on its S.E. end lies in latitude 27° 54′ 30″ N., and longitude 34° 48′ 30″ E.

Tirahn Island.

TIRAHN, the largest island in this part of the sea, is 7 or 8 miles in extent; on its southern part, near the centre, is a high peak about 700 feet high, which lies in latitude 27° 55′ 15″ N., and longitude 34° 39′ E. The east end of Tirahn and the west end of Senaffer are 2 miles distant; between which there is a passage, but there is a small shoal in the centre. Close off the south and west sides of Tirahn are no soundings; the west side is distant from the peninsula of Sinai 4 miles, but the passage into the sea of Akabah is only 1 mile broad, as the reefs from Tirahn extend nearly across to the main land, leaving a narrow and deep channel, called the Strait of Tirahn, through which the wind and swell come down with great violence.

Sherm ul Moyah.

From the high peak of Tirahn S. 67° W. (*true*), distant 14 miles, on the peninsula of Sinai, are two small bays, lying close together, affording indifferent anchorage for ships. The northern one, called SHERM UL MOYAH (from having a well of water near the beach), is the best anchorage. The entrance is narrow, and nearly blocked up with rocks, close to which, just at the entrance of the bay, a vessel may anchor in 6 or 7 fathoms in safety; and should it blow from the southward, she may warp into the bay, passing the rocks, when she will be completely land-locked. The water at the well is a little brackish, but would answer for stock or cooking.

Sherm Sheikh.

The other bay, called SHERM SHEIKH (from having the tomb of a Sheikh on the beach), is more capacious and entrance larger; but the water being so deep, bottom cannot be found at 40 and 50 fathoms, till you are within 300 yards from the beach in the bay, when there are from 15 to 8 fathoms, sandy bottom. The coast outside these bays is a precipitous cliff, having no soundings near the shore. Here also the winds meet, when it is blowing hard from N.N.W. out of the Gulf of Suez, and N.N.E.

Meeting of the winds.

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* Here the *Palinurus* rode out a hard gale from the N.N.E., with 4 anchors down.

out of the Gulf of Akabah, coming in gusts and changing in a few seconds, from both quarters. Still a vessel, with a little perseverance, can easily get to anchor, keeping well to windward, and then running along shore. From these harbours the Bedouin Arabs of TOOR are always on the look-out, eager and happy to convey letters or passengers from here to Suez or Cairo. They are civil and attentive, and may be freely trusted; in four days they take letters to Suez. Between these harbours and Ras Mahommed, distant 8 or 9 miles to the S.S.W., there is no anchorage on the coast; the hills come close to the sea and present a grand range of mountains, extending to the N.N.E. and N.N.W., from 8,000 to 9,000 feet high.

## THE STRAITS OF JUBAL, AND GULF OF SUEZ.

The STRAITS OF JUBAL I shall name as extending from Ras Mahommed to Toor Harbour, on the Arabian side; and from the Island of Shadwan to the peninsula of Zeitee, on the other. Straits of Jubal.

The principal parts on the Arabian side are RAS MAHOMMED; SHAB MAHMOUD, a reef; Shab Ally, a reef, and the dangers off the coast to the northward of Shab Ally. On the Egyptian side, the island of Shadwan, the Seaoul or Clive Islands, and reefs to the East of them; Jubal Island, Gaysoom, or Fair Island, Ushruffee Islands, and reefs to the East and N.W., and the peninsula and high land of Zeitee. In the Straits of Jubal are regular tides; also in the sea of Suez, strong enough, when contrary, to prevent a ship from working to windward.

RAS MAHOMMED*, the extreme point, in lat. 27° 43′ N., and lon. 34° 20′ 20″ E., is an abrupt broken cliff, with a flat top: it is about 90 feet high, and decreases in height to a low sandy plain, a little to the northward of the Cape; in the centre of which stands a remarkable black hillock about 150 feet high, having a large pile of stones on its top, erected by the crew of the Honourable Company's surveying vessel *Palinurus*. This hill lies 2½ miles to the N.W. of the Cape, and is in latitude 27° 45′ 30″ N., and longitude 34° 18′ E.; it is the best guide at night to clear a ship of the south point of Shab Mahmoud, as well as to point out the large anchorage between Shab Mahmoud and the reefs extending to the West of Ras Mahommed. Close to the S.W. point of Ras Mahommed there is a low coral island, connected with the cape by a reef. To the West of the cape, 4½ miles, a reef extends off shore with no soundings close to it, or Ras Mahommed; in one part of the reef extending to the West, there is a break, having a sandy bottom of 6 and 7 fathoms, but so full of sunken rocks, that few vessels would attempt anchoring there. Do not approach Ras Mahommed too near in the night, as the white cliffs and land are not easily seen, though the black hillock is perfectly distinct. Ras Mahommed. Anchorage.

SHAB MAHMOUD, south point, is W. 10° S. (*true*) from the extreme point of Ras Mahommed, distant 7½ miles, and E. 10° N., distant 17 miles from the high part or centre of Jubal, N. 52° E. distant 6½ miles from the black hillock on Ras Mahommed, and N. 21° E. (*true*) distant 14 miles from the south and high part of Shadwan. On this extreme of the shoal there is a beacon rock 3 or 4 feet above water; there are no soundings near the south or west sides of this shoal, but good anchorage on sandy bottom in 18 and 10 fathoms, to the N.E. and E.N.E. of the beacon rock. Soundings extend to the N.N.E. from this rock and shoal to the reef off Ras Mahommed, having an opening of two miles. This is excellent anchorage in N.W. winds, and can be easily made at night, by attending to the bearings given for the point of the shoal, or beacon rock, keeping the black hillock bearing N. 48° E. (*true*) and extreme point of Ras Mahommed, when you anchor nearly East, or a little to the southward of East. Should the night appear unfavourable for passing through the Straits, a ship may anchor here, and should on no account attempt to work through, if the island of Jubal cannot be seen. In light variable winds a vessel gets through the Straits with less difficulty than in strong N.W. winds. SHAB MAHMOUD, from the beacon rock, extends N. 38° W. (*true*), 6 miles in length, making a slight curve to the westward of this bearing; there is a channel between Shab Mahmoud and the reefs off the main, but the northern entrance is too intricate, except with a fair wind, for ships to pass through. The reefs off the main land to the northward of Shab Mahmoud lie about 3 miles from the shore, and N. 55° W. (*true*) from the beacon rock, distant 12 miles, bring you to the entrance of the channel between Shab Ally and the main, in which there is good anchorage. Shab Mahmoud. Beacon Rock on Shab Mahmoud. Good Anchorage. Intricate Channel. Good Anchorage.

If to the northward of the beacon rock, and standing towards the north end of Shab Mahmoud, the southern high part of Shadwan ought not to be brought to the West of South; you will then be 1½ miles from the shoal, taking care not to bring the black hillock to the South of E. ½ S.

SHAB ALLY, an extensive shoal, whose western boundary lies in the middle of the Straits, and contracts the channel to 6½ miles; the southern point, which is broken into several small reefs, lies W. 21° N. (*true*), distant 13 miles from the beacon rock, and from Jubal Peak N., 24° E. (*true*) 8¾ miles, the black hillock bearing E. ½ S.: the west side lies N. 27° W. from the southern high part of Shadwan, and the N.W. and north end due North from Jubal, distant 13 and 16½ miles. A line drawn through these points will give the North, South, and West extremes of this shoal. Under the south point, good anchorage in 15 or 20 fathoms is obtained; also between it and the reef off the main land, which here forms the entrance of a good channel, 3 miles broad. Shab Ally. Good Anchorage.

* Rise and fall 5 feet; high water full and change 6 hours. Var. 9° 48′ W.

When in a fair way to enter this channel from the southward, Jubal ought to bear from S. 35° W., to S. 45° W. (*true*), and Shadwan S. 12° E. (*true*). This channel may be safely used in the day-time, as it affords good anchorage ground throughout, and the water is smooth; the northern entrance is also capacious, but a good look-out must be kept when approaching the reef.

To the northward of Shab Ally the Straits widen 10 miles; still off the Arabian shore there are some dangerous reefs and patches, extending 3 miles from the coast, which is here a low sandy desert. On approaching this shore reef keep the lead going; should a ship decrease her water to 25, 15, and 10 fathoms, she ought to tack immediately. Jubal, bearing S. 18° E. (*true*), leads clear of these dangers to latitude 28° 9′ N.; you are then abreast of a bay on the Toor side, called SHEIKH RYAH, so named from the tomb of a Sheikh. This anchorage is 5½ miles to the S.S.E. (*true*) of Toor, and affords excellent shelter for ships; there is a patch of rocks on entering the bay, which can be easily avoided; you anchor in 7 or 8 fathoms sandy bottom. These are all the dangers on the east side of the straits.

*Sheikh Ryah.*

*Shadwan Island.*

SHADWAN, and the channel to the West of it, a large high island about 700 feet high, with precipitous sides, is 7 miles in extent, N.W. and S.E.; the southern high part lies in lat. 27° 28′ N., and lon. 34° 6′ 30″ E. There are no soundings on its east, south, and S.W. sides; on its western side, fronting the Egyptian shore, and near the N.W. there is a low sandy point, extending a considerable distance to the westward: soundings from 8 to 10 fathoms extend from this point to the southward, and towards the island. This is excellent anchorage in N.W. winds, but care must be taken to avoid a very small sunken rock, nearly in the middle of the bay; this rock can be seen if a good look-out is kept, having only 2 or 3 feet water on it. This anchorage will answer very well for a vessel making the straits in blowing weather, as you may work up under the lee of Shadwan, in quite smooth water; the winds are sometimes very baffling under its lee, more especially when it blows from the N.W., in the straits. The distance between the western side of Shadwan to the reefs off the Egyptian shore, is 5 or 6 miles, having no soundings near the channel. With the south part of Shadwan bearing E. 24° N. (*true*), distant 8 miles, there is a large shoal, nearly 2 miles in extent, having no soundings on its east side; to the N.W. of this shoal, 3 miles, there are others, off which, and in the space between them, there are 10 and 25 fathoms. A small island of coral cliffs, called Gumarah, lies 3 miles to the S.E. (*true*) of the large shoal as before mentioned; it has no soundings near it, and bears from Shadwan, high part, S. 42° W. (*true*), distant 9 miles. S. 32° E. (*true*), distant 1½ and 3 miles from Gumarah, are two small shoals, with no soundings to the East of them; these are all the dangers in the channel to the West of Shadwan. After anchoring at Shadwan, a ship may proceed through the northern channel, where there is smooth water, into the Straits of Jubal.

*Excellent Anchorage.*

*Gumarah Island.*

*Northern channel from Shadwan anchorage.*

This channel lies between the north end of the Shadwan and the several islands formerly called the Clive Islands, which lie 4 or 5 miles to the N.W. of Shadwan. A reef extends off the N.W. end of Shadwan ¾ of a mile, between which and the Seaoul Islands there is a small reef in mid-channel. Due North from Shadwan, N.W. point, distant between 2 and 3 miles, is a small but dangerous reef; there are no soundings on the east and north sides of this reef, but there are 10 and 12 fathoms a little distance from the S.E. side, where a vessel might anchor upon an occasion: the high part of Jubal bears from this reef W. 33° N. (*true*), distant 7 miles; the southern or high part of Shadwan, S. 42° E.

*The Seaoul Islands.*

The SEAOUL Islands are small, low coral islands; the eastern one, the largest, surrounded by a reef, having no soundings near it; the other two islands lie 1½ miles to the West of the former: they are three small broken coral cliffs, and are situated on the northern part of an extensive reef, off the south side of which there is anchorage on a sandy bottom. Care must be taken not to approach this reef too close, as there are numerous coral rocks detached from it, but can be easily seen. In this channel a N.W. wind will carry a ship into the Straits of Jubal, passing close to the reefs off the Seaoul Islands, between them and the reef as mentioned, off the north end of Shadwan. In hauling up to the N.W. you pass close to a large horse-shoe shaped reef which lies about a mile and a-half to the North of the east Seaoul Island. These are the only dangers between Shadwan and Jubal, and in working in the large straits near these two islands, a bearing of Shadwan is the best guide; with it bearing S. 42° E., or Jubal W. 24° N. (*true*). This bearing of Shadwan, south part, touches the whole of the dangers on the west side of the Straits of Jubal, including Jubal, the Ushruffee Islands, and up to the high land of Zeitee.

*Anchorage.*

*Shadwan Anchorage to the Straits of Jubal. Working in the Straits of Jubal.*

*Jubal Island.*

Jubal Island, the centre or high part of which is in lat. 27° 37′ 40″ N., and lon. 33° 53′ 15″ E., is moderately elevated in the centre, and of a circular form, being about two and a-half miles in diameter; the eastern side is steep, having no soundings near it at a depth of 30 and 40 fathoms. On its S.S.W. side, two low coral islands nearly join, being connected with it by a reef. On hauling round the south end of Jubal, good anchorage is to be found between it and the reef off the low coral islands in 7 or 8 fathoms, sandy bottom, distant about a quarter of a mile from Jubal, with the high part bearing North; this is excellent anchorage in S.W. winds, and from which a vessel can easily proceed again into the straits, and make the anchorage under Shab Ally. From one to four miles to the N.N.W. of Jubal are three low coral islands connected with it by a reef, in which they are situated; the largest one, being near Jubal, forms a small bay with the north end of Jubal, in which there are soundings of 25 and 35 fathoms; it would not answer as an anchorage.

*Excellent Anchorage under Jubal.*

West 2 miles from the north end of the shoal off Jubal, is the north end of GAYSOOM Island, called Fair Island in the old charts; the north end of this island is a little elevated, having a small brown hillock on its extreme point, which bears from Jubal N. 48° W. (*true*), distant 5¼ miles. This is the entrance of a deep bay, between Jubal and Gaysoom, in which there are soundings from 25 to 38 fathoms, with good anchorage, close under the south end of Gaysoom. The disadvantage of this anchorage is, that a ship runs so far to leeward before she obtains shelter from the N.W. swell, and loses time in beating back again through the channel. Gaysoom Island. Inconvenient Anchorage.

GAYSOOM, from its north point, extends to the S.W. about 3½ miles, where it is nearly joined by another low coral island, extending to the N.W. about 3 miles; the north point of this lies W. 12° N. (*true*) from the brown hillock on Gaysoom, distant 3½ miles, between which it forms a bay, with soundings of 25 and 30 fathoms. Although the entrance to this bay is 1 mile broad, the N.W. swell comes in from Zeitee and renders it unsafe anchorage; the northern side of the channel is bounded by the south point of the reef, extending to the southward of the Ushruffee Islands.

The USHRUFFEE ISLANDS are groups of low coral islands, scattered on an extensive reef, which bounds the west side of the channel, in the Straits of Jubal; the north end of these islands and reefs extends N. 39° W. (*true*), distant 14 miles from the centre of Jubal. To the East of the Ushruffee Islands, distant 1 mile, are two small and dangerous reefs, connected with each other, but leaving a channel between them and the islands. There is also indifferent anchorage under the lee of them, and soundings of 10 and 12 fathoms extend a little to the eastward of them, but they are no guide for a ship nearing them at night. They bear from Jubal N. 31° W. (*true*), distant 8½ and 11 miles, and to clear them at night a ship ought not to bring Jubal more to the East than S.S.E., till the south end of the high land of Zeitee bears West, or the centre of the high land of Zeitee on with Mount Agrib bearing W. 23° N. (*true*). This bearing just touches the northern end of the dangers off the Ushruffee Islands, and is also a mark for the south end of Shab Ally. There are soundings of 17, 20, and 35 fathoms to the N.E. and North of the Ushruffee Islands and reefs, distant 1 or 2 miles from the dangers, the northern point being a detached reef which lies to the N.W. and W. of the islands, and extends, as before mentioned, N. 39° W. (*true*), distant 14 miles from the Peak of Jubal. This is the northern danger on the west side of the straits, and on which the Indian ship *Samdang* was wrecked in 1831, proceeding to the southward through the straits at night with a fair wind: here the N.W. swell breaks with great violence. Ushruffee Islands. Two dangerous reefs.

Between this reef and the high land of ZEITEE there is a fine bay, with soundings on mud in 17 and 20 fathoms, but the N.W. swell rolls into it; yet anchorage in smooth water may be found in its north-eastern part, close under a low sandy island and reef extending a little way from a projecting point of Zeitee, called Petroleum Point, from having some petroleum wells about 1 mile to the N.W. of the point, and close to the beach. This point bears from the reef off the Ushruffee Islands W. 29° N. (*true*), about 3 miles. The south point of Zeitee is quite low, and nearly joined by a low coral island, to the southward of which, 2 miles, extends a reef, having a good channel between it and the reef off Gaysoom, or Fisherman's Islands, which leads into the Bay of Zeitee, a deep bight, running up the N.W., distant 5 miles. In this bay, or at its entrance, a ship may anchor, if she is very desirous of obtaining wood, with which the Egyptian coast abounds in the Bay of Zeitee; and, strange to say, Suez is partly supplied from this place by boats: the wood is all dry. Good Anchorage. Petroleum Point and wells. Zeitee Bay or Inlet; good anchorage.

From Petroleum Point the coast is safe to approach, close to the high land of Zeitee, having 30 or 40 fathoms close to the beach or rocky shore.

TOOR HARBOUR, the peninsula of Sinai, is in lat. 28° 14′ N., and lon. 33° 41′ 30″ E. This harbour is so well described in Horsburgh's valuable Directory,* that it needs no other; the water here is excellent and in plenty. This is the nearest point from which a traveller can proceed to Mount Sinai; the journey is performed on camels, and generally takes two days; the road, for the most part, is execrable, winding the greater part of the way through broken and precipitous ravines of the rocky mountains. In a valley, at the foot of Mount Sinai, there is a large Greek monastery, where travellers are entertained with the utmost hospitality and good-will; it is inhabited by twenty-five or thirty Greek and Russian monks of the Greek church; they live in a state of celibacy, and never eat animal food. Toor Harbour.

Mount Sinai is 3,000 feet above the monastery: by observations on the top of the mountain, with an artificial horizon, it is in lat. 28° 31′ N., and lon. 34° 5′ E. None of the Sea of Suez, except a very small portion about Hummum Bluff, can be seen from Mount Sinai; Toor, and all the coast of Egypt, being hid by Mount St. Catherine, which is a few hundred feet higher than Sinai, and lies 2 miles to the westward of it. Mount Sinai.

The islands Tirahn, Senaffer, Shooshooah, and entrance of the Sea of Akabah also, some distance up, can be seen distinctly, as well as the high mountains about Moilah, by which we fixed the station of the mount, taking angles with the theodolite.

From Toor to Cairo the Bedouins will convey letters or passengers in from three to five days; however, boats from Jiddah, wishing to communicate speedily with Cairo, generally land their passengers or letters at a place called SHERM SHEIKHDELE on the N.E. side of Ras Mahommed, mentioned in a former part of

* See "Additional Remarks on the Red Sea" at the close of this chapter.

these directions; by doing this they avoid the strong N.W. winds in the Sea of Suez. About 1½ miles from Toor, at the foot of some low hills, is a square building or tower, at the foot of a large date grove, which belongs to the convent of Mount Sinai: this grove of dates is watered by a large and clear spring of bitter and brackish water, which lies close at the back of the garden walls near the hills, and makes an excellent warm bath, its temperature about 95°, with a small building enclosing it.

Date Grove.

Abreast of Toor the sea is 17 miles broad. There is an extensive spot of shoal water in midway, on which there is not less than 6 or 7 fathoms, and on each side of it 26 or 30 fathoms, sometimes 35 and 40 fathoms, which is the general depth in the centre of the Sea of Suez.

Anchorage.

W. 29° S. (*true*) from Toor, distant 17 miles, and on the Egyptian side, is a small point, extending a little to the eastward of the line of coast, between which and the northern end of the high land of Zeitee is formed a small bay, in which a vessel may anchor in 7 or 5 fathoms sandy bottom, a little sheltered from N.W. winds; Mount Agrib bears from the anchorage W. 4° N. (*true*), distant 23¾ miles. The soundings gradually decrease as you approach the shore, taking care not to go too close to the Spit of Reef, which extends about 1½ miles to the eastward of the point; the point is called RAS SHUKHAIR, and lies in lat. 28° 5′ 30″ N., and lon. 23° 33′ E.

From Ras Shukhair the Egyptian coast lies in a direction N. 34° 30′ W. (*true*) to lat. 29° 00′ N., preserving nearly a straight line, with a few small bays to the westward.

Native Pilots may be trusted.

Along the coast so far mentioned the soundings decrease as you approach the shore, but on no account stand within 20 fathoms at night: even at that depth, if a vessel is going fast through the water, she may be on shore before another cast of the lead is taken; a navigator ought, therefore, to be on his guard, and measure his distance from shore to shore. The native pilots are excellent in judging their distance from shore, and when to tack of a dark night. I think they may be implicitly trusted in the navigation of the Gulf of Suez; and that a commander of a ship has little else to do than see his ship properly worked. The Arab pilots have so long and often been accustomed to work up and down the sea, that they may be expected to have a thorough knowledge of its localities.

Mount Agrib.

MOUNT AGRIB, or Aggarrib, is the most conspicuous mountain on entering the Gulf of Suez; it has a high conical shape, and stands pre-eminent among a lofty range on the Egyptian coast. It can be seen one hundred miles distant, is about ten thousand feet high, and lies in lat. 28° 6′ 45″ N., and lon. 32° 57′ E.

Shab Khoswan.

Indifferent Anchorages.

From Toor Harbour the Arabian side takes a direction N. 48° W. (*true*), distance 30 miles, to the dangerous reef a few miles N.W. of Great Jehan Peak, called Shab Khoswan, in lat. 28° 34′ 30″ N. To the East of this line the coast has a few small bays, affording indifferent anchorages, one under Great Jehan Peak, the other about 6 miles above Toor, near a few withered and blighted date trees; but they are both bad spots for anchoring, the water being deep, little sheltered, and close to the shore. At the latter place are those famous 'written mountains,' one of which produces musical sounds, a source of superstition to the natives. From Toor to Jehan an extensive range of hills comes close down to the sea, and the shore is bold to approach, till you get to the northward of Jehan Peaks, which are two pointed hills. The Great Jehan, which is the highest and northern one, is in lat. 28° 32′ 30″ N., and lon. 33° 20′ 30″ E.; it bears from Mount Agrib N. 38° E. (*true*). There is a lagoon of some extent between Jehan and Shab Khoswan.

Ras Sherateeb.

SHAB KHOSWAN, a dangerous reef, dry at times, lies 2 miles off Ras Sherateeb, a low sandy point, with which it is connected by shallow water, having a passage only for boats; it bears from Great Jehan Peak N. 65° W. (*true*) 6 miles; there is a good anchorage under its south-east end, in 6 and 7 fathoms. Care should be taken not to stand too close in, as the water shoals suddenly. This danger ought to be avoided at night, by keeping well over on the Egyptian coast; there are 12 and 15 fathoms at half-a-mile to the westward of the shoal.

W.S.W. from Shab Khoswan, the Egyptian coast is 11 miles distant.

Ras Burdess Anchorage.

From Shab Khoswan the coast extends due North 18 miles to Ras Burdess, under which point there is anchorage.

Ras Burdess.

RAS BURDESS is a low sandy and bushy point, in lat. 28° 52′ N.; the coast forms a slight bay to the eastward, between Burdess and Sherateeb to the southward, with soundings of 10 and 15 fathoms near the shore. The next place of anchorage is Ras Selima, or Zelima, 14 miles to the N.N.W. of Burdess.

Ras Zelima. Anchorage.

Ras Zelima is a low sandy point close to the hills, which here again extend to the beach; this anchorage is well-sheltered from north-west winds. W.S.W. from Ras Zelima the Egyptian coast is 21 miles distant.

Ras Hummum or Gad Mallap.

RAS HUMMUM, or Gad Mallap, is the next cape; it is a low sandy point, in lat. 29° 14′ N., off which, about 3 miles to the westward, is shoal water. There is a good anchorage on the south side of this cape; a large, high hill, called Hummum Bluff, lies close to the shore: it is in lat. 29° 11′ N., and lon. 33° 4′ E. Mount Agrib bears nearly due South from the extreme point of the cape.

Hummum Bluff.

Hummum Bluff is 1,500 feet high, and shows a precipitous cliff nearly overhanging the beach; at the foot of this hill there is a hot salt spring, and two hot caverns, called Hummum ul Faroun (the baths of Pharaoh),

The Hon. Company's surveying vessel *Palinurus*, while at anchor off Hummum Bluff, sheltered from the north-west; the wind suddenly shifted to the southward, and blew a hard gale, which she rode out with three anchors a-head, topsail yards and topmasts down, and not a cable's length from the shore; her tender was driven on shore, and was a total wreck in a few hours. This will show how necessary it is, when anchoring from north-west winds, not to hug the shore too close, in case of a shift of wind, which is very sudden, at times unexpected.

To the W.S.W. of Ras Hummum, 14½ miles, and on the western shore, is ZAFARANA POINT, in lat. 29° 6′ 30″ N.: there is a bank of sand extending to the East, about 1½ miles from this cape, which has 10 and 12 fathoms close to its outer edge; some small hillocks are near this cape. Ships ought to be cautious at night in working between the reef off Hummum Bluff Cape and Zafarana, the distance across being only 10 miles; when Hummum Bluff bears E. 15° S. (*true*) it is on with the shoalest and most extensive part of the reef off Hummum Bluff Cape. Zafarana Point.

A mile or two to the southward of Zafarana Cape there is a deep bay, in the northern of part of which a ship may anchor in 6 or 7 fathoms, with Hummum Bluff bearing E. 22° N. (*true*), well sheltered from north-west winds by the shoal water off Zafarana. A range of high hills lie a few miles to the West of Zafarana, which terminate abruptly a few miles to the northward, between which and the high land of Aboouderage, further to the northward, there is a long flat desert or valley between the mountains. It was at this spot, say the Arabs, that the Israelites passed over the sea, which is here 12 miles broad. Good anchorage.

From Zafarana Point the western shore has a direction N. by W. 16 miles to Ras Abooderage, in lat. 29° 20′ 30″ N., with soundings close to the shore of 10, 12, and 15 fathoms.

RAS METAMER is a low sandy point and spit on the eastern shore, in lat. 29° 26′ N.; there is good anchorage to the southward of this cape in 11 or 12 fathoms sand. Ras Metamer bears from Hummum Bluff N. 42° 30′ W. (*true*), and from Jibbel Sedour, or Barn Hill (a capacious hill on an elevated range, in 29° 40′ 30″ N. and lon. 33° 3′ E.), S. 43° W. (*true*). The sea abreast of Metamer becomes contracted to 9 miles, between the southern end of the high land, or cape of Abooderage, and Metamer. Ras Metamer.

From Metamer to Suez the shore is bounded by a coral reef, which extends in some places from a half to 1 mile from the land. Caution is requisite in approaching the shore at night, as the coast is low and deceitful as to the distance; from 23 fathoms in some places is close to the shore.

On the western side from Ras Abooderage, in lat. 29° 20′ 30″ N., forms a deep bay, in a direction N. 42° W. (*true*) 20 miles, then N. 30° E. (*true*) 20 miles, into the entrance of the Bay of Suez. The southern point of Abooderage Bay is bounded by the high hills of Abooderage, which come close to the sea, and are bold and safe to approach, having 30 fathoms close to the beach. In the northern part of this bay the water is more shoal, and affords good anchorage from north-west winds. Adoga Point is the north entrance of the bay, and runs out a considerable distance, forming a low point not seen till very close to it.

RAS SEDOUR, a low sandy cape on the eastern side, is in lat. 29° 36′ N., a small sandy spit runs off the cape; there is good anchorage on its southern side, in 12 and 15 fathoms sand. On the northern side of this cape there are two small reefs, about 1½ miles from the shore, and 3 miles from the cape. Ras Sedour.

RAS MESALLE is the next cape on the eastern shore; it lies in lat. 29° 49′ N. Two miles to the southward of this cape a narrow spit of sand extends off shore to the S.W. There is good anchorage on any part of the coast between Ras Sedour and Ras Mesalle in 14 or 15 fathoms water; between Ras Mesalle and the opposite shore, and near Point Adaga, is only 6 miles, having 15 and 20 fathoms in mid-channel. Care should be taken on approaching Adaga Point, as a spit of sand extends off it between 2 and 3 miles to the N.E. Ras Mesalle.

GAD UL MARAKAB is the south point of the harbour of Suez: a spit of sand extends out to the West of it half-a-mile. Upon the eastern shore, and on the northern side of this point, is a deep bay of shoal water, with a channel up to the town for buggalows and small craft: the town is situated on a low point of land on the west side of a small creek full of islets and shoal water, where the buggalows, or native boats, anchor. Gad ul Marakab.

To the southward of Gad ul Marakab, and one mile from the shore, there is a patch of sunken rocks, dry at low water. In the centre of the bay is a small reef, bearing from the white tomb in the town S. 23° W. (*true*), and from Gad ul Marakab W. 2° S. (*true*); in the bight to the northward of the low point of Adaga, on the western shore, there are four patches of rock, the outermost one being about 1½ miles from the shore; the soundings are pretty regular, 10 and 11 fathoms on the western side, shoaling gradually to 4 and 3½ fathoms as you approach the flats of the town. The best place for a vessel to anchor is with the white tomb bearing N. 7° E. (*true*), and Gad ul Marakab S. 53° E. (*true*), in 4 or 5 fathoms; she will then be off the mouth of the channel leading up to the town of Suez.

SUEZ town is in lat. 29° 58′ 00″ N., and longitude, by mean of many observations with four good chronometers, 32° 38′ 30″ E. The lunar observations making the longitude 32° 39′ 30″ E., a difference of 1 mile only. Variation at Suez, in 1830, was 9° 20′ W. Suez.

Provisions are plentiful and good; in the seasons, various fruits, such as oranges, pears, apples, and plums, also plenty of fine cabbages, lettuces, &c., may be had. The natives are civil and friendly to Europeans.

## COAST OF ABYSSINIA, FROM RAS BILLOOL TO RAS HURUB, AND THENCE TO COOBACH.

The islands and rocks lying to the northward and eastward of Ras Billool have already been described. From Ras Billool 34 miles, N. 36° W. (*true*), is Ruckma Island; the soundings between, all along the coast, are regular, gradually increasing from it, and without any dangers to the chain of islands off it, above mentioned. The coast runs sharp round to the west of Ruckma Island, forming a cape bearing that name. The island itself is situated on the coast reef, with an anchorage in a bight to the southward of it, where there are 4 and 5 fathoms. To enter this anchorage, keep the island on board, in order to avoid a projecting part of the reef off the coast, to the S.E. of it: this anchorage is well sheltered from N.W. winds, and the reef South and S.E. of it most probably affords shelter from the South winds, but not so good as to the North of Ras Ruckma, where there is good anchorage in moderate depths.

*Ruckma Island.*

There is a high island on the coast reef, 3 miles to the West of Ruckma, and to the South of it a bight in the coast, running in to the south, in which are two wells, the nearest being brackish and the other better, and a moderate supply may be obtained. There is neither village nor huts.

To the North and West of Ras Ruckma are six high white rocky islands. The three northernmost are near each other, and the southernmost of these, called White Quoin Hill, is 5 miles from the cape, and has a rock a-wash 1 mile S.W. of it. There are regular soundings on either side of this cluster, and a channel inside them. The other three islands lie in the bight of the bay, in a westerly direction, and in a line of 5 fathoms soundings.

The white rocky islands on this coast are so called from the white dung of birds, with which they are generally covered.

*Ras Sherayer.*

RAS SHERAYER is a high, remarkable, brown, volcanic hill, of the barn shape, situated close on the beach, with no other hill near it: it is about 10 miles from Ras Ruckma, and 1½ miles North of it; at about a mile from the coast, is a 5-fathom patch, with 12 to 18 fathoms close to it. N. by W. (*true*), 8 miles from Ras Sherayer, is the easternmost of the JIBBEL ABBELAT ISLANDS: they are both near the coast, from which they are separated by narrow channels. Between the outer island and the coast are 14 to 17 fathoms, and 17 fathoms between the two islands; but this channel is narrow, in consequence of a reef extending from the easternmost island. The passage between the westernmost island and the main is narrow, and only fit for Dows. These two islands are of considerable height, and are volcanic, but no remarkable stones were observed on them. At 3½ miles S.E. of the easternmost is Sale Abbelat Island, or the Button Rock.

*Jibbel Abbelat Islands.*

*Sale Abbelat Island.*

To the West of these islands the coast trends away to the S.W. and South, forming a triangular bight, or small bay, where are regular soundings and good anchorage, protected from southerly winds.

*Haycock Hill.*

Haycock Hill, so called from its resemblance to one, is situated near the coast, in the S.E. part of this triangular bay; and to the S.W. of the Abbelat Islands, being 4½ miles from the outer one, and is one of the most remarkable hills in their neighbourhood.

*Basin Hill.*

Basin Hill is 9½ miles West, a little southerly from the Haycock: it is flat at one end, and rises at the other into the shape of an inverted basin.

*Sugar-loaf.*

Sugar-loaf is nearly 8 miles S.W. of the village of Edd, and is of the haycock shape, as seen from Abbelat Islands; but at Edd it forms an oblong hill. At the latter place, a much more remarkable hill is seen to the South of the Sugar-loaf, of a quoin shape, with a remarkable knob on its south end, by which the former may be known.

*Jeseerat Coordarlee.*

JESEERAT COORDARLEE is 9 miles W.N.W. of the easternmost Abbelat Island, and 2½ miles off the coast, with which it is connected by a spit of sand and rocks, a reef of which, with 2 and 3 fathoms water on it, surrounds the island.

*Barn Rock.*

BARN ROCK is rather high, and is 2 miles E.N.E. ½ E. (*true*) of the reef of Coordarlee Island, with 12 to 19 fathoms between them.

*Low Rocks.*

LOW ROCKS are two, S.E. of the reef, off Coordarlee Island, with 15 and 20 fathoms between them: they are 8 or 10 feet above water, and the surf breaks over them in a breeze.

From Coordarlee Island the coast trends away to the westward, and then to the northward, forming an elbow at Edd, where there is a bight running in to the South, 1½ miles, in depth and breadth; and there is a similar, but smaller bight 3 miles East of the town, forming a square and rocky cape between them, with regular soundings off it. The soundings are also regular in a bight West of the cape; but there are only 3 fathoms in the outer part of it, and 2 and 1 farther in. The soundings increase very regularly from the cape off shore.

*Edd Village.*

The village of Edd is situated upon the sandy plain in the western bight of the coast, and consists principally of oblong huts, with arched tops, and an outer covering of coarse grass mats; it is of no great extent, has a

few small boats, and considerable trade with Mocha, in mats, rafters, ghee, and goatskins. The *Benares* anchored to the N.E. of the village, distant about two miles, and three-quarters of a mile from the nearest land, which forms a square cape, in 5¾ fathoms. Good cattle may be had here, but no water, excepting at some distance, and that is brackish.

Jeseerat Coordomeat.

JESEERAT COORDOMEAT is a rugged high island, nearly 11 miles North of Edd village, and 2½ miles from the coast. A rocky spit extends from it 2 miles to the West, having a channel of 5 and 9 fathoms between it and the coast. To the S.W. by S. of Coordomeat, distant 2 miles, are three small, but high rocky islands, situated upon one shoal bank, with 5 and 6 fathoms, in a narrow channel between them and the coast; and there are 7 to 14 fathoms between them and Coordomeat. In the rains, good water may be had nearly opposite Coordomeat on the coast, where it forms a waddy.

Ras Seerboot.

RAS SEERBOOT is 13 miles N. 49° W. (*true*) from Coordomeat Island. To the N. westward of this cape is the highest of the range of hills, with an elevation at each extremity; the highest part is seen from a little above Edd, to a little below Amphilla, and is what Captain Court calls the Barn Hill. Single Peak is a conspicuous hill, to the south of the former. Rugged Peak is 5 miles S. E. by S. (*true*) of Double Peak, and has a broken irregular top, with a sharp small point on its western part.

N. 35° W. (*true*), 16 miles from Ras Seerboot, is RAS CUSSAR; and from thence 9 miles N. 47° W. (*true*), is RAS OURATA; and 9 miles N. 50° W. (*true*) further, is Ras Shuckhs, off which is a shoal; it commences at Ras Ourata, and extends to 3 miles off Ras Shuckhs, first forming a bight: the western part slopes away more gradually, and terminates at a small island, which is 4 miles East of Durramsus. The north bluff is the most remarkable piece of high ground on the near range of hills, and from it the land gradually slopes away to a point in the N.W. To the north of it is a conspicuous quoin hill, by which it may be known, when midway between Ras Cussar and Ras Ourata.

Durramsus Island.

From Ras Shuckhs the coast trends away about 8 miles, to a small island close in shore, just spoken of, to the West of which, 3½ miles, is Ras Amphilla. Durramsus Island is about a mile to the N.N.W. of Ras Amphilla, with 8 fathoms in the channel between them, which leads to anchorage ground in 6, 7, and 8 fathoms, outside the coast reef; but a spit runs off the S.W. part of Durramsus Island; and to the N.W. of the island, distant 1½ miles, is a shoal, having upon its shoalest part 3 fathoms. Between this shoal and the island, is a channel of 8, 9, and 10 fathoms, leading into anchorage with Durramsus Island on the East. There is anchorage in a bight in the reef to W. by S. of Durramsus 2½ miles, about half a mile from shore, with an island on the West; here is 5½ fathoms of water, and Amphilla is about 2 miles to the westward of it.

Amphilla.

AMPHILLA is one of the most wretched places on the coast; the village, which hardly deserves the name, consists of six miserable huts close to the sea, on the verge of a sandy plain, and does not appear capable of furnishing any supplies. The coast line of Amphilla changes from West to N.N.W., forming a bend in the coast, with Ras Amphilla to the South, and Ras Morah on the North. The distance between these two capes is 13 miles, and the coast between them is bounded by a reef with seven low coral and sandy islands upon it. There is no reef off the outer points of either cape, but it lies in a line with the coast, from Ras Amphilla, above 1½ miles from it; and after passing the anchorage in the bight near the village, and the two islands to the West, it extends off shore upwards of 3 miles, then again decreases, and ceases at Ras Morah. Five or six miles to the N.W. of Durramsus Island, and 1½ miles from the coast reef, are two low coral islands, called the Burmat Hadjee Islands, with good soundings on either side.

To the S.S.W. of Amphilla village, on the sandy plain, is a small hill, low in the centre, with a peak at each extremity, called the Paps. The inner and outer hills on Jibbel Morah are a little to the South of Ras Morah; the former is a small barren hill, and to the East of it are two or three small peaked hills, the largest and most remarkable of which is the outer hill: the distance between these hills is less than 2 miles.

Ras Unduddah.

BEACH HILL is 11 miles N. 54° W. (*true*) from Ras Morah, and 2 miles further, W. N.W., is Ras UNDUDDAH, the eastern boundary of Howakel Bay; 3 miles to the N.W. of which is Omer Sarridge Island, with good anchorage in 4 to 6 fathoms under its south side, protected from N.W. and South winds. The east end of this island is in latitude 15° 5′ N., longitude 40° 34′ E.

Howakel Bay.

HOWAKEL BAY is a large bight in the line of coast, upwards of 30 miles broad, and 15 miles deep, containing many islands and shoal patches, most of the islands being low, and composed of coral and sand: the largest islands are also bordered by coral, and on the highest parts, as well as on the main, mineral specimens are found.

Beach Hill forms the eastern extremity of this bay; it is a round double-topped hill, on the south part of Ras Unduddah; and a little to the N.W. of it is a rugged oblong hill, forming the extremity of that cape. Near Hill is to the W. S.W. of Beach Hill, and forms a peak on the near high land. Shore Hill is to the West of the latter, and is a black peak, in the southernmost part of Howakel Bay. Barn Hill is on the western side of Howakel Bay.

Howakel Island. Jibbel Bucker, and Adjuce Islands. Jibbel Sarridge Island.

Of the islands in this bay, Howakel is the highest and largest of the group, and has a conspicuous peak towards its centre. There is a small village on the island, but no supplies for ships; they procure their water from two wells in the bay. JIBBEL BUCKER, to the South of the last, forms a high oblong hill, bluff at the extremities. Adjuce Island, to the North of Howakel, is a low coral island, with some trees on it, and there are a few huts, but no supplies: they also procure their water from wells in the bay. JIBBEL SARRIDGE, or OMER SARRIDGE, is a low coral island with bushes, 5 miles to the N.W. (*true*) of Beach Hill, and connected with shoal water to the south-eastern part of the bay, as well as to some other low islands to the West of it: its anchorage has been already described.

Entering Howakel Bay through the East Channel.

To enter Howakel Bay from the eastward, which is the best channel, pass between Howakel and Jibbel Bucker Islands, and two long low islands to the east of them, and edge away to the S.W. along the western side of Bucker Island, passing between it and the low islands to the West of it, where the soundings decrease to 4 and 3 fathoms sand, and will afterwards deepen to 5, 6, and 7 fathoms mud, where you may anchor; or if desirous of running farther in, keep a look-out for patches one and two miles off the S.W. part of Bucker Island, which may be passed on either side. The *Benares* left them to the eastward, and anchored in 8 fathoms mud, one mile to the North of a small island, connected to the main in the bottom of the bay, with a high quoin on its south end.

Entering Howakel Bay through the N.W. Channel.

To enter the bay from the N.W., steer in to the coast between Adjuce and a small island N.W. of it, and keep all the islands W.S.W. of Howakel to the eastward, running through between them and the coast reef. There are two small islands in the middle of this channel, which may be passed on either side; and it will, perhaps, be best to pass in to the North of them, to avoid the point of coast reef which runs out and bears South from the outermost of them. Having passed these islands, anchor in 7 or 8 fathoms mud; or if proceeding further in, keep a look-out for shoals, which may be easily seen if the weather is clear lying off the coast, and in the centre of the bay.

On the western side of Howakel Bay, near Barn Hill, is a dry nullah, and two wells of bitter water: there are also a few huts, but no inhabitants seen.

From Adjuce Island to Larmoose Island it is 13 miles N.W. This little island is surrounded by a reef, and is about a mile North of the N.E. point of Hurtow; the coast between it and Howakel Bay forming a bight, with an island in it. Between Larmoose and the main is 10 fathoms water, and about 2 miles to the westward is a rocky patch with 19 fathoms between, and 16 fathoms close without it. N.W., 12 miles from this island, is another, within half a mile of the north point of Hurtow, close to the westward of which is a core running into the south above 2 miles between the coast reef, with from 7 to 2 fathoms in it. West, about 3½ miles from the north point of Hurtow, is an island situated upon the N.W. extremity of the coast reef, with two smaller ones to the southward of it, from whence the coast runs to the S. by W. about 8 miles, and thence to the eastward of South, forming the vast boundary of Goob Ducnoo.

Dissee Island.

DISSEE ISLAND lies about 3 miles to the W.S.W. of the three islands on the coast reef just mentioned, and is one of the pleasantest spots in the Red Sea. It is about 2½ miles in length, N. by W. and S. by E., and about three-quarters of a mile broad; the island is high, consisting of a number of similar hills in perpendicular strata, with a few straggling trees: the central part is a plain, covered with grass. The line of coast about here is very irregular, forming many little bights, of which one is just to the North of Dissee Peak, which is on the highest part of the island, where there is a safe anchorage for small boats. In approaching this place, the soundings decrease quickly from 18 to 10 fathoms, pretty close to the shore. Ships should anchor farther off the island between these depths; there are 17 fathoms only half a mile off. The *Benares* anchored with the village bearing West, the centre bay rock just a-wash S. 31° E. (*true*), distant a quarter of a mile: the ship being a little without the south part of Dissee small bay for boats.

There are some springs of good water about half a mile from the beach, and the road to them good for rolling casks, but a boat load is as much as can be procured in a day. The village consists of 10 or 12 houses, built of laminated stone. There are plenty of bullocks, sheep, and goats, but the inhabitants are not anxious to sell them.

Dissee Sand-bank and Shoal.

About 6½ miles North of Dissee Island is a small sand-bank, connected to it by a narrow reef; and 2½ miles W.N.W. of the sand-bank is a patch of rocks, with 2 fathoms on it; the outer or western part of it is 3½ miles from Dissee sand-bank. The soundings at a short distance from Dissee, along the eastern side of the island to the sand-bank, are 24 to 30 fathoms, mud; and they quickly increase to no bottom, with 40 and 50 fathoms after passing it.

Of the high land in this neighbourhood, Hurtow Peak, to the N.W. of Howakel, is the highest part of the near main land, seen after passing that island, coming from the southward, and forms a conspicuous peak at Dissee anchorage. Quoin Hill is on the eastern side of Goob Ducnoo, and in Dissee anchorage the south point of the island is a little open of it: this is a sloping piece of land of the quoin shape, with a bluff to the N.W.

Goob Ducnoo.

GOOB DUCNOO is formed between the land of HURTOW PEAK on the East, and the land of GEEDAN on the West; and Dissee Island lies in the entrance, with a channel leading in on each side: the eastern one is 1 mile broad in the narrowest part, and the western one is of considerable width. The breadth of the

entrance of this core, from shore to shore, is 12 miles; half-way up it is little more than 4; it then spreads out again, and is $8\frac{1}{4}$ miles broad at the bottom, which is on the parallel of Howakel Bay, and its extreme depth is 30 miles. The soundings are 44 fathoms, mud, at the western entrance, decreasing gradually to 20 fathoms, mud, the lower part, and 16 to 12 fathoms pretty close to the shore. Northerly winds blow directly into it; a vessel would then, perhaps, have some difficulty in getting out. Lord Valentia gave the name of Valentia Island to Dissee Island, and he describes Goob Ducnoo under the name of Ansley Bay. The fertility of the soil in this place is remarkable, the core being bordered by low land, producing rich pastures, with grass of great length; there is plenty of cattle, and a great number of large antelopes. There are some ruins on the west coast of the core, occupying much ground, and an extensive burial-ground near them, but no inscriptions.

Fresh water may be procured.

ARGEEGO, also called DOHONO, is situated in a deep bight in the coast, 17 miles to the W.N.W. of Dissee Island, and to the North of the high land of Geedan; it is a miserable-looking place, consisting of huts. Argeego.

MASSOWAH Island is situated in the northern extremity of Argeego Bay, about 4 miles North of Argeego; it is separated from the main by a narrow channel, which forms a good anchorage. The Island is nearly a parallelogram, half a mile long, and between three and four hundred yards wide, formed principally of coral rocks, of no considerable height, and in great decay. Nearly one-half of the island is occupied by tanks, and a burial-ground; and on the inner half is the town, which is crowded with habitations to the water's edge. The most considerable buildings are the mosques, the Doholah's and Banyan's houses, and a few warehouses, which are built of coral rocks: one of the mosques has two domes, and another has a place like a belfry. There is also a stone-built bazaar, where jowarí, dates, tobacco, beef, mutton, and fowls, and occasionally fish, are to be procured; and also a few brinjals, or fruit of the egg plant, and bhindís [bamíyah], but these vegetables are seldom to be had. The trade is entirely carried on by small buggalows, principally to Mocha and Jiddah, but it is not considerable. Massowah Island and Town.

In approaching this island 7 or 8 fathoms will be found close to the reef that extends off it, and 5 and 6 fathoms off the reefs on the north side of the entrance; but the reef extends further off the island than it does off the north side, where there is a small white mosque. The anchorage lies in a W.S.W. direction, and the soundings in mid-channel are 7 and 8 fathoms, mud; the entrance is 250 yards across, and the broadest part of the harbour 450 yards between the reefs; the anchor should, therefore, be let go in mid-channel. Massowah Harbour. Anchorage.

A light is burnt during the night on the east end of the island, and sometimes also on the jetty. The *Benares* has two or three times run in with north winds, by standing in a little northward of the harbour, and having got close to the coast, run along it to the South in 9 or 10 fathoms, rounding the point at the north side of the entrance, as close as the reef admits, on the east end of which there are 4 fathoms, rocks.

There is no anchorage in this neighbourhood that can at all compare with Massowah, excepting one, which is a mile and a quarter North of it, and called CORE DAHALEAH. This forms an anchorage considerably larger than that of Mossowah, the entrance being a quarter of a mile broad, from a rocky spit extending a quarter of a mile to the North from the south side of the harbour, to the reef on the north side. The anchorage is nearly a mile North and South, and one mile broad, with soundings of 5 and 6 fathoms, mud. There is a rock above water on the spit, extending off the north side of the entrance, and 6 fathoms close to the shore reefs. Core Dahaleah.

Between the harbours of Massowah and Dahaleah, is a piece of land little more than a mile square, connected with the main by a low neck of land, a quarter of a mile broad, probably at times isolated, and apparently better adapted for a town than the small island of Massowah. Water would be quite as conveniently obtained as at present.

The highlands seen from Massowah are Dissee Peak, on the highest part of that island; GEEDAN PEAK, which is a small peak on the centre of a mountain South of MASSOWAH, and is the highest land near the coast, to the westward of Dissee Island. Near Hill is a piece of land $3\frac{1}{2}$ miles W.S.W. of Massowah anchorage, with a bluff on the south part, like the end of a barn. Round Hill, to the W.N.W. of Massowah, has a small quoin on its round top, and shows well six miles North of Massowah. North Hill is a remarkable peak on the west end of the highest outer land seen from Massowah, and distant therefrom 40 miles.

From Core Dahaleah the coast runs N. by W., about 10 miles, to Ras Hurub, and from thence N.N.W. $\frac{3}{4}$ W. (*true*) 18 miles, to a part of the coast called MITHAHACT; it then runs N. by W. 10 miles, to Coobach. Mithahact and its neighbourhood is low and sandy, bordered in some parts by low jungle, backed by salt-water swamps, where the natives procure salt, beyond which are ranges of low barren sand-hills. The coast is bordered by a reef from Dahaleah to Coobach, where it terminates; its breadth varies from 1 to 2 miles from the shore, and on some parts of it anchorage may be obtained on mud. Ras Hurub. Mithahact and Coobach.

From Coobach the coast runs 16 miles N. by W. $\frac{1}{2}$ W. (*true*) to Mersa Ebrahim; the coast between is sandy, bordered with jungle, and behind it a water-course, with high banks of soft sand.

THE EASTERN AND NORTHERN ISLANDS UPON THE DHALAC BANK.

Moghady, Oucan, and Salma Islands.

MOGHADY is the south-easternmost island on the Dhalac Bank, in latitude 15° 32½′ N., and longitude 40° 55′ E. It is a high rocky island, about 1½ miles in length, North and South, and nearly a mile wide. About 1 mile to the West of it is OUCAN, also a high rocky island, about 3¼ miles long E.N.E. and W.S.W., and 1 mile broad. Salma is a high rocky island, about 2 miles long, E. by N., and W. by S., and above a mile wide: it lies 3 miles N. by W. (*true*) from Oucan, and has a narrow reef on its north side.

Hutteetao and Tor Islands.

HUTTEETAO is 3½ miles West of Salma. This is a high rocky island, about 2 miles long North and South, and 1 mile broad, with a reef on its east side; and about 2½ miles West of its north end is Tor Island, also high and rocky, about 2 miles long, E. by N. and W. by S., and 1 mile broad.

Soober and Mustarmilla Islands.

SOOBER is 2½ miles North of Salma. This is a small high sandy island, with a reef extending a mile to the North and West; and to the west of Soober, 2⅔ miles, is Mustarmilla, also a small high sandy island, with a reef extending a mile to the N.E.

Dahret Segarla, Segarla, Ruckah, and Rajuma Islands.

DAHRET SEGARLA lies about 2½ miles N. by W. of Soober. This is a low sandy and bushy island, about 1 mile long, East and West, with a reef extending a mile from its north side; and 2½ miles N.N.W. from this island, is Segarla Island, about 3 miles long, East and West, and 1 mile wide: this is a low sandy and bushy island, with a bank of shoal water, extending 1½ miles off its north side, and 1 mile S.E. from its eastern end. About 2 miles S.W. of Segarla is RUCKAH, a low sandy and coral island, with a bluff of bushes on its east end; and 1½ miles West of Ruckah is Rajuma Island, and 1½ miles to the South of it is another small island.

Billhaha, Duldeah, and Dulgoof Islands.

BILLHAHA, a low sandy island, nearly 4 miles N.N.W. of the north end of Segarla, is situated upon a dangerous shoal, which extends 5 miles N.E. from the island, and 1 mile south from it. About 7 miles W. ¼ N. (*true*) from Billhaha is Duldeah, a small, low, sandy island, surrounded with shoal water, which extends 2 miles South of the island. E.S.E. 2½ miles from Duldeah, is a shoal rocky patch. Dulgoof lies 2½ miles W. by N. of Duldeah; this is also a small, low, sandy island, with a few bushes on it; and a reef extending to the N.E. and E., 2 miles.

Howateb and Howateb Kebeer Islands, &c.

HOWATEB and HOWATEB KEBEER are two low, sandy, bushy islands, 4 and 4½ miles to the north-eastward of Dulgoof. Shoal water extends upwards of a mile to the East of Howateb Kebeer, and a 3-fathom shoal lies half a mile off its S.W. part. At 5 and 6 miles to the eastward of it are two rocky patches of 2 and 3 fathoms; and N.E. by E. 9 miles from it, is a shoal rocky patch, with 14 fathoms close to it: this patch is in lat. 15° 59′ N., and lon. 40° 48′ E.

Gurreet, Dulgold, and Jermalko Islands.

GURREET is 4 miles S.W. and DULGOLD is 5 miles South of Dulgoof Island; they are low, sandy islands, situated upon a bank of shoal water, about 3 miles apart. Senach is a low, sandy island, 3½ miles S.E. by E. (*true*) of Dulgold, and 4 miles West of Rajumah. JERMALKO is a small island surrounded by a reef, lying W. by S. 4½ miles from Senach.

Derome Island. Denafaree Island.

DEROME lies 7 miles W.N.W. from Dulgoof. It is a small, low, sandy island, situated upon the centre of a bank of shoal water 6 miles long, which extends E.S.E. and W.S.W. 3 miles from it. DENAFAREE is a small, but high rocky island, lying 3 miles South of Derome; it is situated upon a bank of rocks which extends 1 mile to the N.E. and 2 miles to the S.W. of it. N.E. by N. (*true*), 3½ miles from Derome, is a shoal, rocky patch.

Shab Alli.

There is deep water round and between all the islands and their reefs that have been described, but vessels coming in from the eastward must be careful to avoid a dangerous shoal bank called the SHAB ALLI: its southern end lies about three miles from Soober, and it thence extends N.N.W. about 10 miles, approaching within 2 miles of Dahret Segarla, with 9 to 15 fathoms close to its west edge. It is in its widest part about 2 miles, but the bank on which it is situated is about 9 miles in breadth, having 17 fathoms close to its eastern edge: it has several patches, and various depths on it, which, as well as the depths between the islands, will be best understood by looking at the Chart.

Dulkoss and Sale Arabee Islands.

DULKOSS, or SAYEEN Island, 4 miles west of Denafaree, is 2 miles long, rather high and rocky, and surrounded by shoal water on Dhalac reef; S.S.E. 4½ miles from Dulkoss, and 8½ miles W. by N. from Jermalko, is Sale Arabee, a small high rocky island of coral formation, lying 9½ miles East of Doobelloo village on Dhalac, and surrounded with shoal water on Dhalac reef. N.N.E. ½ E. (*true*) 1½ miles from it, is a small rocky patch, and another lies North of the island, 2½ miles.

W. ½ S. (*true*), 5 miles from Jermalko, and S.E. by E. (*true*), 4 miles from Sale Arabee, is a small island with a reef round it, and a rocky patch 2¼ miles N. by E. of it.

Dulfeedo and Dulangebart Islands.

N.W. 6 miles from Derome is Dulfeedo, a low sandy and coral island, nearly 2 miles long, N.E. and S.W., and 1½ miles wide: a bank of shoal water extends from it to E.S.E., upwards of 3 miles. S.S.W. 3 miles from it, and W. by N. (*true*) 6½ miles from Derome, is DULANGEBART, a low sandy island, 1½ miles long, surrounded by a reef which extends 3 miles E.S.E. from it.

Mursataban, and Dulhalum Islands.

MURSATABAN, a low sandy island, 1½ miles long, East and West, lies West, 6½ miles from Dulangebart; and to the N.N.W. of it, one mile, is the south end of Dulhalum, which thence extends N.N.W. 3 miles, and is one mile broad. This is a low sandy island, surrounded by shoal water: it has a fishing village on it, and there are two small sand-banks between it and Mursataban.

Agrub and Dahret Dulkoss.

S. by W. 1½ and S. by E. (*true*) 2 miles from Mursataban are the Agrub Islands, low and sandy; and 1½ miles S. by E. (*true*) from the easternmost is Dahret Dulkoss Island, also low and sandy.

Sale Segun.

SALE SEGUN is a high coral and barren island, upwards of 2 miles off Ras Goosum, and nearly 4 miles West of Dulkoss: it is narrow at the base, and spreads out at the top, and situated near the eastern edge of the bank which forms the west side of the channel to Doobelloo anchorage.

Erwa Island.

Doobelloo Anchorage.

ERWA is a moderately high, flat coral island, about 12 miles in circumference, separated from Dhalac by a very narrow channel for small boats, and has a few fishermen's huts on it. On its western side is a gut, with 3 to 6 fathoms in it, leading to the anchorage for vessels visiting Doobelloo, which is of an oval shape, formed in the reef about 2 miles S.E. of the town. The narrow entrance to this place begins about 1½ miles South of Sale Segun, and the coast reef must be kept close to in order to avoid the shoal part of the banks to the eastward: the channel is extremely narrow, and to the N.E. of Doobelloo there is very little more than 1 fathom in it, and that on rocks. On the South side of the island is a large space of 5 or 6 fathoms' depth. The rush of water in and out of this gut is of considerable force.

Durgoman Seggeer and Durgoman Kebeer Islands.

Three miles S.W. of Marsataban are DURGOMAN SEGGEER and DURGOMAN KEBEER. The former is a low sandy island, the latter high and rocky, with wood on the S.E. part of it. They lie about 1½ miles off the N.E. point of Dhalac, and have shoal water all about them.

Nora Island.

About a mile West of the north end of Dulhulum, is the S.E. end of NORA ISLAND, which extends 11 miles N.N.W., and is 6 miles at the widest part, nearly of triangular shape, of about 32 miles in circumference: it is a low sand and coral island, with a few spots of date trees. There are three fishermen's villages on it; one on the S.W. part, bearing the same name as the island, another on the S.E. part, and the third on the N.W. part, in a deep bay, where good water may be procured. This island is situated upon a bank of 1 and 2 fathoms, by which it is connected to the N.E. part of Dhalac. UNTOENTORE, about 16 miles to the N.E., is upon the same bank, and also several islands to the N.W. and West of Nora, so that there is no channel for ships across the Dhalac Bank to the southward of Untoentore Island.

Good Water.

No Channel for Ships.

DILLADEAH, W.S.W. 3 miles from S.E. point of Nora; Durafroos and Bettah, about 3 miles S.S.W. and W.S.W. from its S.W. point; and Sale Nora, about a mile from the west part of the island, are all small rocky islands, situated near the edge of the shoal bank of Nora, with deep water at a mile S.W. and West of them.

GESERAT ASKAR, SALE HADASSEE, NORA HADASSEE, DAHRET, ENTVEDOOL, and DUHULUM, are all situated upon, and some of them near the edge of the shoal bank of Nora, off the N.W. and north part of that island, from 2 to 6 miles. Some of them are low, sandy islands, and others rather high and rocky, with bushes.

Mahoon and Nahelej Islands.

Eight miles East of the S.E. part of Nora Island is the Island Dulfeedo, already described; and between, but rather nearer to Nora, are several low sandy islands or banks, without names. W.N.W. 5 miles from Dulfeedo, and 1½ miles off the east side of Nora, is Mahoon, a low sand and coral island, of about 8 miles' circumference. Nahelej is a long, low, sand and coral island, about 2 miles wide in the broadest part, and 8 miles long: it is off the N.E. part of Nora, its south point being about a mile to the North of the west end of Mahoon, from whence it extends to N.N.E. About 7 miles East of its north end is a 4-fathoms patch, with 14 fathoms near it.

Dahret Goobarree and Gubbehoo Islands.

North, 1½ miles from the north end of Nahelej, is DAHRET GOOBARREE, a low coral island, about a mile in length, and, like the two former, is situated upon the shoal bank of Nora. Three miles W. by N. from its north end is a 2-fathoms patch of rocks, with 8 and 9 fathoms near it. About 2 miles to the N.E. of this island is that of GUBBEHOO, a low sand and coral island, with a few bushes on it; it is about 2 miles in length, North and South, and has a bight on its east side. It is situated upon and near the N.E. extremity of Nora shoal bank, or reef, which extends about a mile beyond its N.E. end.

Untoentore Island.

UNTOENTORE is the north-easternmost of this range of islands, although it is separated by a narrow

channel between the reefs, of 6 to 8 fathoms. It is a low, bushy, sand and coral island, with several shoals to the westward of it: namely, one N.W. by N. (*true*) 3 and 4 miles, with 4 fathoms on it; one to the West $3\frac{1}{2}$ miles, very shoal; and a 2-fathoms patch, W.S.W. (*true*) $2\frac{1}{2}$ miles: this island, though small, has shoal water extending from it to the S.W. (*true*) $2\frac{1}{2}$ miles, and the 2-fathoms patch is half a mile from the extreme end of it. Untoentore Island is in latitude 16° 21′ N., and longitude 40° $17\frac{1}{2}$′ E.

Harmeel.

HARMEEL is the north-easternmost island on the Dhalac Bank; its eastern point in latitude 19° $32\frac{1}{4}$′ N., longitude 40° $15\frac{1}{2}$′ E., bears N. by W., distant 12 miles from Untoentore Island; it extends about 5 miles to S.W. and South, and is upwards of 13 miles in circumference. It is a low, woody, sand and coral island, with a deep bight on its north side, forming a shallow salt lake. About 2 miles East of its south end is a sand-bank called SALE HARMEEL, and about 2 miles West of its south point is Inteusnoo, a small, low, woody, sand and coral island, surrounded by a reef. These islands are situated upon a sand and coral bank, 8 miles square, upon which the soundings are very irregular, from 1 to 15 fathoms: the S.E. point of this bank, with 3 and 4 fathoms on it, extends to within 4 miles North of Untoentore Island.

Sale Harmeel and Inteusnoo Islands.

Romea Island and Shoals.

ROMEA is about 5 miles West of Harmeel, and is a very small island, composed of sand and coral, and covered with wood. Between it and the bank of Harmeel is a channel 2 miles wide, with 17 and 19 fathoms; and to the W.N.W. of the island, 6 and 8 miles, are two dangerous rocky patches; the first with 4, the other with 1 fathom on it, on which the water breaks in blowing weather. There is also a breaking patch, 8 miles W.S.W. (*true*) from it: it is also surrounded by several other banks of 2 and 4 fathoms, but there is deep water near the island; and, in fine weather, the bank may generally be seen.

Usbob Island.

USBOB is a small, low, bushy, coral island, $1\frac{1}{2}$ miles South of Inteusnoo, with a channel of 16 and 17 fathoms between them. It is surrounded by a bank, and there is a sand and coral bank one mile West of it, which is 7 miles long, and 4 miles broad; its north part is within 2 miles of the parallel of Romea Island, and there are patches of 2 fathoms on it, but a deep water channel between it and Usbob.

Hukally Island.

HUKALLY is a low, bushy, sand and coral island, 5 miles South of Usbob, and 7 miles West of Untoentore: a reef runs nearly 2 miles W.S.W. from it, and a 7-fathoms patch lies 3 miles S.W. by S. from the island.

Sale Amber.

Suratoo and Wooster Islands.

SALE AMBER is 4 miles West of Hukally, and is a small woody island; and $4\frac{1}{2}$ miles to the West of it is SURATOO. This island has some small peaked hills upon it, and is one of the highest and largest on these banks, being 13 miles in circumference, and nearly divided into two by a small inlet on its north side, which forms a lake of salt water. The island is principally composed of coral rock, and only affords a supply of fire-wood. Wooster is $2\frac{1}{2}$ miles West of Suratoo, is $1\frac{1}{2}$ miles long, and rather high, being composed of coral rock: there are small rocky islets lying to the eastward of its north and south ends, and a 2-fathoms patch between it and Suratoo. Suratoo and Wooster are situated upon a sand and coral bank, 10 miles long East and West, and from 3 to 4 miles broad, with from 8 to 10 fathoms on the east part of it, which extends to E.S.E. from Suratoo: there are 5 to 7 fathoms between it and Wooster, both to the East and West of the 2-fathoms patch, and no bottom at 50 fathoms close to the South of Suratoo.

N. by W. (*true*), 3 miles from Suratoo, is a patch of 2 and 3 fathoms on the S.E. part of a bank, which extends thence to the North $3\frac{1}{2}$ miles, where there are 3 fathoms, and West 5 miles, where there are 11 fathoms, and 45 fathoms close to.

Tunnum.

W.S.W. (*true*), 3 miles from Wooster, is TUNNUM Island, about $1\frac{1}{2}$ miles in circumference, and rather high: SALE TUNNUM is smaller, but has a remarkable small peak on it; and there are other rocky islets lying to the West and N.W. of Tunnum, and a rocky patch of 2 fathoms and less lying $3\frac{1}{2}$ miles S. by W. (*true*) from it. S. by E. (*true*), 5 miles from Tunnum, is a little island called Jerome: and South, $9\frac{1}{2}$ miles from it, is another of the same description, called Jurmtudda; these are all situated upon one bank, whose length, North and South, is $11\frac{1}{2}$ miles, and breadth, West of Jurmtudda, 9 miles.

Jerome and Jurmtudda Islands.

Tookfash and Ommarlee Islands.

TOOKFASH is 5 miles S. by E. of Jerome, is a low sandy island, with a 2-fathoms shoal 2 miles N.E. by N. (*true*) from it. Ommarlee is 5 miles W. by S. from Tookfash, and is a small low bushy island of sandy formation; to the westward of which, $3\frac{1}{2}$ miles, is Sale Badeera, a small, low, rocky island. Aboo Sherryer, Dahret, and Mulluk, are three small sandy islands, from $3\frac{1}{2}$ to $5\frac{1}{2}$ miles to the northward of Sale Badeera: the first two are low coral islands covered with wood, and there is a 2-fathoms channel between. A sandy spit runs off the south end of Aboo Sherryer, and to the eastward of it, 1 and 3 miles, are two rocky patches; another to the West about 1 mile, and one midway between this island and Ommarlee. Mulluk is a low sandy island, with some bushes, separated from the others by a narrow channel of 6 and 7 fathoms in the centre, and shoal water extends to the North of the island, nearly 3 miles. About 3 miles South of Sale Badeera is Buradoo, a low triangular island, $3\frac{1}{2}$ miles in circumference, with a few dome trees on it. S.E. $1\frac{1}{2}$ miles from Buradoo is Dohul, a low, quadrilateral island, 9 miles in circumference, with some dome trees on it. A small

mosque and village, with about 100 inhabitants, are on the N.W. side, and near the trees. On the east side of the island are three or four wells of fresh water during the rains, but brackish in the dry season: they barely afford sufficient for the inhabitants, who are fishermen. Dahrel is about 1½ miles West of Dohul, and is a low sandy island, with a few bushes on it, lying nearly 3 miles to the N.W. of Dahrel: the two latter islands border the east side of the inner channel.

The whole of the above islands are situated upon one bank of very irregular soundings, from 12 to 1 fathom, as will be seen by the chart. Its south extremity is 2 miles south of Dohul, and from thence to the north extremity of the reef off Mulluk, it occupies a space of 17 miles; and its breadth, from the reef to the N.E. of Tookfash to the western side, is 14 miles; but there appears to be a channel between Tookfash and Ommarlee, of 8 or 9 fathoms.

Entadell and Omer Sale Islands.

About 7 miles N.E. of Tookfash, and 11 miles West of the north part of Nora Island, is Entadell, a sandy and rocky island, with a shoal patch three-quarters of a mile to the West of it, and a 14-fathoms channel between it and Nora. Omer Sale is 4 miles S.S.E. from it, and 5½ miles from the westernmost part of Nora, on its parallel; this is also a sandy and rocky island, and has a 3-fathoms shoal 1 mile N.W. (*true*) of it, and a 20-fathoms channel between it and Nora.

To the West and S.W. of the latter is SALE RABAH, consisting of high rocks, and GAD ENTOGAELUF, a low sand-bank. ENTOGAELUF, HADBARO SEGGEER, and HADBARO KEBEER, are three low sandy islands, from 7 to 8 miles West of the S.W. point of Nora, and are situated upon a shoal rocky bank. S.W. (*true*), 1½ miles from the southernmost, is a dangerous rocky patch of 1 fathom.

To the S.S.E. of the latter islands, from 4 to 7 miles, are the little islands Dalbahout, Dulkoos, Dahret Dubanet, and Dillathum, all lying to the S.S.W. of Nora, and W.N.W. of the N.W. point of Dhalac. Dallathum, heretofore described, lies off that point of Dhalac; the others lie on two sand and coral banks, with a channel of 12 to 14 fathoms between them, about 3 or 4 miles N.E. by N. from Derridgerree, hereafter described.

Howalee Huttoob, and Howalee Shoorah Islands.

West 14½ miles from Romea, and N.N.W. (*true*), nearly 12 miles from Suratoo, is HOWALEE HUTTOOB; and S.W. by W. ½ W. (*true*), 6½ miles from it, is HOWALEE SHOORAH: these are two small coral islands situated upon a sand and coral bank, 16 miles long E. by N. and W. by S., and from 3 to 4 miles broad. About 4½ miles East (*true*) of Howalee Shoorah is a patch of 2 fathoms, and 4 miles W.S.W. (*true*) from the same island are some rocky patches above water: there are 27 fathoms at half a mile North of Howalee Huttoob.

Kaddo Island.

S.W. ½ S. (*true*), 10 miles from Howalee Shoorah, is the island KADDO, a narrow island 2 miles long in an east and west direction, and rather high, with a rocky islet off its west end. This island is situated near the north end of a sandy and rocky bank, which running S.E. ½ S. (*true*) forms a deep channel on the east side of Harrat: the bank is about 3 miles wide, and the most dangerous part discovered is the south end, where there are only 2 fathoms, this is about 9 miles West of Jerome Island. This bank extends 11 miles to the S.E., and 4 miles N.N.W. (*true*) of Kaddo, has 8 fathoms on its north end, and 26 fathoms close to it. The north end of Harrat Island bears S.S.W. (*true*) 10 miles from Kaddo.

Aboo Rubah Island.

ABOO RUBAH is a small coral island of a wedge shape, with small rocks off the N.E. and S.W. ends: it lies 10 miles W.S.W. ½ W. (*true*) from Howalee Shoorah, and N.N.W. (*true*) 7½ miles from Kaddo.

## DESCRIPTION OF THE SOUTHERN AND WESTERN ISLANDS UPON THE DHALAC BANK, FORMING THE SOUTHERN CHANNEL TO MASSOWAH; AND THE COAST AND ADJACENT ISLANDS FROM THENCE TO SUAKIN.

Dulgrose, Mashilgar, and Bolhessoo Islands.

We have already stated that Moghady is the south-easternmost island on the Dhalac Bank, and that Oucun is to the westward of it. The next to the westward is DULGROSE Island, lying 2 miles W. by S. (*true*) from Oucan: this is a high rocky island of triangular shape, surrounded by a reef, and 1¾ miles S. by W. from it is MASHILGAR, a small but high rocky island, also surrounded by a reef. S.W. ½ W. (*true*), 4 miles from Mashilgar, is the low sandy island of Bolhessoo, about a mile in length, with a 4-fathoms rocky bank about half a mile to the N.W. of it. This little island is in lat. 15° 25′ N., and lon. 40° 43′ E., and with RAS UNDUDDAH, from which it is distant 24 miles N. by E. ½ E. (*true*), forms the south entrance of the inner channel. Omer Sarridge bears from it S.S.W. ½ W. (*true*) 22 miles, and Howakel nearly S.W. by W. 23 miles.

Sale Amber.

N. 64° W. (*true*), 13 miles from Bolhessoo, is SALE AMBER, a low sandy island with a reef round it, lying 5 miles S.S.E. (*true*) from the S.E. point of Dhalac Island. N.E. by N. (*true*) 3½ miles from Sale Amber, is HOWATE, with a reef round it; and N.E., North, and N.N.W. (*true*) from 2 to 4 miles from it, are OMES NYUL, DURAKAH EL BAH, and DURAKAH EL BAHAR, all low sandy islands, lying off the east end of Dhalac.

Howate.

Moosmaree Island.

W. ¼ N. (*true*), 4 miles from Sale Amber, is the east end of Moosmaree Island, extending thence 2½ miles

W. by N., and half a mile broad: it is high and rocky, about 4 miles South of the S.E. extremity of Dhalac, and is situated on the eastern part of a dangerous and extensive rocky spit that runs out E. by S. from the S.W. part of Dhalac Island. This island is surrounded by a cluster of rocky islets forming arches, with the water passing through them. Upon the same reef, 9 miles further to the westward, and about the centre of the south part of Dhalac, are several small rocky islets and rocks above water; and besides these, at 8 miles further westward, there are some little rocky islands in the anchorage at the S.W. part of Dhalac.

Shummar Island. About 16 miles W. $\frac{1}{4}$ N. (*true*) from Moosmaree is the east end of SHUMMAR Island, extending thence W. by N. $2\frac{1}{2}$ miles, and three-quarters of a mile wide, surrounded by a reef. This Island lies about 3 miles from the S.W. part of Dhalac, and 5 miles E.N.E. (*true*) from the island at the north point of Hurtow land, and forming therewith the narrowest part of the south entrance of the inner channel.

N.W. (*true*), $7\frac{1}{2}$ miles from Shummar Island, is the little island Enteurah, surrounded with a reef, and hereafter described. Dhalac Island. DHALAC Island is 120 miles in circumference, and of extraordinary shape: its south side is 23 miles long, and its greatest breadth is 18 miles. It is principally composed of coral rock, interspersed with spots affording a supply of good grass in the rainy season. The only beasts seen on the island are asses, goats, sheep, and antelopes; the latter are numerous. The number of towns or villages are seven, namely: Doobelloo, Derboshat, Salat, Dhalac Kebeer, at the S.W. part of the island, Goobanee, Cumbeeber, and Memlah. DOOBELLOO, on the eastern side, has the principal trade and best appearance of any of the villages: most of the houses are built of coral and gatched, others are built of loose stones; the outer walls 10 feet high with sloping grass tops, the plastered houses having square tops; there are also some huts made of coarse grass. The principal Sheikh of the island resides at Derboshat, and the others of the different villages are subservient to him.

The trade of Doobelloo is principally with Loheia and Gheesan; from thence they import jowari and dates, and give in return the produce of the pearl banks, such as fish, sharks' fins, the horny part of shell fish, turtle, Fresh Water. and pearls. They preserve their water in tanks, which are filled during the rainy season: there are also a number of wells about 2 miles to the N.W. of Dhalac Kebeer, near the beach, surrounded by an embankment forming an irregular figure, about 200 feet across in the broadest part. During the rains there are also a number of fresh water pools upon the island. There are four mosques at Dhalac Kebeer, two of which have domes, and two burial-grounds.

Goob ut Sogera. GOOB UT SOGERA is an extraordinary formed place in the western side of Dhalac; the entrance to it is about 5 or 6 miles to the N.N.W. (*true*) of Dhalac Kebeer. The passage is very narrow, with 6, 7, and 8 fathoms in it, increasing quickly to deeper water on rounding the point of Dhalac; and a vessel should anchor in 10 or 12 fathoms near Cockloft Island, at the inner part of the passage, as further in the core there is no ground at 42 and 32 fathoms; and there are 27 to 20 fathoms near the south extremity of it, where there are three small cores of 5, 6, and 11 fathoms, the easternmost of which has mud, the other two, rocky bottom. The westernmost of these cores is the most convenient for boats obliged to procure water at Dhalac, which must be transported in mussucks, and the ship should anchor a little without this small core in 20 fathoms, to expedite the watering.

The tide runs with rapidity in the entrance to this place, and a ship with its assistance may get in or out with little difficulty; otherwise with a fair wind only, for there is no room to work through. The rise and fall of the tides in this core, according to Capt. Court, is 9 feet.

Nokerah Island. The north side of the passage to Goob ut Sogera is formed by the island NOKERAH, which is nearly 6 miles in circumference, and of middling height, composed principally of coral rock, but interspersed with small valleys, and low spots of good grass and a few dome trees on different parts of the island: there is also a village built of madrepore without cement, and with grass tops, containing about 100 inhabitants. Goats and good water can be procured; the latter is on the eastern side of the island, about half a mile from the beach, over a rugged road; it is therefore necessary to carry it to the boat in mussucks. Although there is always sufficient for the inhabitants, a ship could not be certain of procuring water here in the dry seasons.

There are three or four small islands on the N.W. side, and two on the East: the western one on the East is a high remarkable islet or rock, called Cockloft Island: it stands as it were upon a pivot, the lower part being washed off or worn away to that degree that it must soon fall, and is connected by shoal water to Nokerah, where the boats go for water. From the small island East of it shoal water projects half a mile to the South into the core, with 42 fathoms close to it.

Three and a half miles to the S.W. of the entrance to Goob ut Sogera is the little low sandy island Enteurah Island. ENTEURAH before-mentioned, surrounded by a reef, and a little to the southward of it Dhalac reef extends $2\frac{1}{2}$ miles from the shore, leaving a passage between it and Enteurah reef, nearly 2 miles wide, with from 6 to 13 fathoms in it, sand and mud, with deep water close to the north and south parts of the passage.

Sale Bayuice. SALE BAYUICE is a small, low, black, rocky islet close to Dhalac Island, bearing S. 68° E. (*true*), about $3\frac{1}{2}$ miles from Enteurah, and the reef projects from it to the West 2 miles, and turns in sharply again on its south side to the coast; from thence to the S.W. part of Dhalac there is no reef, and there are 45 fathoms on

mud, close to the shore, and to the projecting part of the reef off Sale Bayuice; the soundings are very irregular, from 15 to 4 fathoms, rocks, and 2 fathoms a little further on it.

Anchorage off Dhalac Kebeer. The land forms a small bight off the village of Dhalac Kebeer, which is fronted by the reef that extends along the south part of the island, and close to it the water is very deep. There are several small islands on the reef off this place, and vessels venture to anchor here; but it is not advisable for a ship to attempt it, as with a southerly wind it is a lee shore, and the bottom, excepting near the beach, in shoal water, is hard rock.

Indubbee and Terrah Islands. INDUBBEE ISLAND is about $1\frac{1}{4}$ miles N.W. (*true*) of Nokerah Island, and is connected with it and Dhalac by shoal water: it is nearly 1 mile square, of middling height, barren and rocky, and no good anchorage off it. TERRAH ISLAND is smaller than Indubbee, is of triangular form, and separated from it by a small shoal channel. On the East and North of Indubbee are three rocky islets.

Gundabelee Island. GUNDABELEE ISLAND is 1 mile West (*true*) of Indubbee, with a narrow channel between them, in which are some sunken rocks that may be seen in fine weather. On the West of Gundabelee is a shoal 2 miles long, with 1 fathom on some parts: this bank is situated on the outermost edge of the bank, 33 fathoms being close to its south side.

Surad Island. SURAD is a rocky island, of middling height, about $5\frac{1}{2}$ miles North of Indubbee, and connected to a point of Dhalac by shoal water, from which it is distant nearly 2 miles, N.N.W. (*true*). About 2 miles South (*true*) of Surad, and half a mile from the point of Dhalac, is a 1-fathom patch of rocks. To the W. and N.W. (*true*) of this patch, and between it and Indubbee, is a deep hole in the bank of soundings, with 65 and 68 fathoms near its edges: therefore, vessels should anchor off the south end of Nokerah in a convenient depth: 10 fathoms will be found in the entrance of Core Nokerah.

Dillathum Island. N. by E. (*true*), $4\frac{1}{2}$ miles from Surad, is DILLATHUM, about a mile N.W. (*true*) from the N.W. point of Dhalac, with a narrow passage of 2 fathoms between. Between these islands the coast of Dhalac forms a deep bay. Dillathum is a low sand and coral island, and has a reef on its west, north, and east sides.

Anchorages. Besides the anchorages already described, there are two others, one at the N.W. and the other at the north part of the island, where ships can anchor; in fact, these appear to be the best about Dhalac. The first is opposite to Cumbeeber village, having in the south part of the bay another small village: both these villages have good water, but in small quantities. The other is opposite Goobanee village.

The land of Dhalac is generally low, with some very small hills upon it, as follow: Jibbel Goosum, a coral mound, on the north-eastern part of the island; Bluff, a conspicuous mound of quoin-shape, as seen at the anchorage in Goob ut Sogera; it is situated to the E.N.E. of the village on Nokerah Island. Imumuck, a small piece of table land, 3 miles North of Nokerah Island.

Darghelee Island. N.W. by W. (*true*), 7 miles from Indubbee, is DARGHELEE, a small, low, sandy island, with a few small trees or bushes on it. One mile off its east side is a shoal of rocks and sand of 2 and 4 fathoms, with 13 to 24 between it and the island; and 1 mile South (*true*) of the island is a patch of 5 fathoms, with 16 to 26 between it and the island. This patch is on the outer edge of the bank, and 50 fathoms are close to it. DURGHAUM is similar to Darghelee, and is nearly two miles to the westward of it: this island has a reef off its western end, and is near the edge of the bank.

Derridgerree. DERRIDGERREE is a small, low, woody island lying N.N.W. $\frac{1}{2}$ W. (*true*), 8 miles from Indubbee, and N.E. $\frac{1}{2}$ N. $3\frac{1}{2}$ miles from Darghelee.

Dahrel Island. From Durghaum to Dahrel Island is 12 miles N.W. by W. (*true*), and thence to Dulbahout N.W. (*true*) 3 miles. Both these islands have been described, and also Dohul to the eastward of them: they form the north-eastern boundary of the inner channel.

Laboo. Seven miles N.W. $\frac{1}{4}$ W. (*true*) from Dulbahout is Laboo, a small sandy island, lying 1 mile off the south-western end of Harrat Island, to which it is joined by a reef.

Harrat Island. HARRAT is a low sand and coral island, its south point being 25 miles due North from Massowah; it thence extends $7\frac{1}{2}$ miles N. by W. $\frac{1}{2}$ W. (*true*), and is $1\frac{1}{2}$ miles broad. There are some dome trees near the centre, and fire-wood can be procured: a village of about twenty huts is situated to the South of the dome trees, and five wells, affording a scanty supply of brackish water in the dry season. Two miles off the north point of Harrat is a small rocky island, called SALE BADEERA, with rocks above water between it and Harrat. (Sale Badeera.) HARRAT REEF extends 9 miles N. by W. $\frac{1}{2}$ W. (*true*) off its north end, with which is included the small rocky island, and the soundings on it are from 1 to 18 fathoms, very irregular, as $4\frac{1}{2}$ fathoms rocks were found near the north end, and 5 miles from the island only 2 fathoms, rocks. (Harrat Reef.) The reef also extends 5 miles off its south end, and, including the island Laboo, extends out nearly 2 miles West from the south end of Harrat. The soundings on the South reef of Harrat are very irregular, between 12 and 24 fathoms at a moderate distance to the southward of Laboo, but abreast and northward of that island there are from 7 to 4 fathoms, rocks. There is a little reef on the east and west sides of this island; that on the West forms the eastern

boundary of the inner channel, which is about six miles wide from the extremity of Hurrat South reef to the irregular soundings off the coast, and 7 miles from the inner part of the North reef to 20 fathoms, mud, near the coast.

This island and extensive reef is separated on the east side from the main bank by a deep water channel, having from 23 fathoms in its south part to upwards of 55 fathoms towards the North, its breadth being about 3 miles, and its length upwards of 20 miles.

N.N.E. (*true*) from the north end of Harrat, distant 10 miles, is Kaddo Island, islet and bank, already described, as well as Aboo Rubah, which lies N. 4° E. (*true*), distant 18 miles from the north point of Harrat Island, and 17½ miles E. ½ S. (*true*) from Mersa Ebrahim. It is a small coral island, with small rocks off both ends, as before said: there are 14 fathoms close to the northward of it, and 67 fathoms a mile to the eastward.

Indesillee Island.

INDESILLEE is a small island with a reef round it, 28 fathoms close to its west side, and 44 fathoms outside it: this island is 28½ miles N.N.W. (*true*) from the north end of Harrat Island, and 7 miles E. ½ N. (*true*) from Mersa Ebrahim.

Diffnane Island.

DIFFNANE is 6 miles N. ½ E. (*true*) from Indesille, and 8½ miles from the nearest shore: this is a low coral island, intersected by small salt-water creeks, filled with mogrove trees, and surrounded by a reef. At half a mile S.W. (*true*) of it are 33 fathoms, and an 11-fathoms patch is half a mile off its N.W. side. The distance between this island and a projecting point of the shore reef is 6½ miles.

Mersa Moobaruck.

MERSA MOOBARUCK is about 3½ miles N. ½ W. (*true*) from MERSA EBRAHIM: these two are small boats' anchorages, and there is a small woody island close to the entrance of the former; and 4½ miles N. ½ W. (*true*) from it, and close in shore, is a low woody island called GUNDALITE. Between it and Moobaruck the coast reef extends about 2 miles from shore.

Garna Duff.

From Gundalite Island the coast runs about N. by W. ½ W. (*true*) 18 miles to GARNA DUFF, all low and sandy. The following is a description of the hills to this place:—Sugar-loaf is a low sand-hill of that shape, when bearing West; Paps is a black hill formed with two knobs—1st Peak is on the north part of mountainous table land which is bluff at both extremities, and is in the first high range: 4th Peak is a round rising eminence on the north extreme of a high mountain in the second range, to the North of the first peak: when brought to the West it is a conspicuous peak. JIBBEL GARNA DUFF is a sand hill 4 miles from the beach, with a bluff to the northward.

Serabar.

From Garna Duff the coast runs N. 15° W. 29, and N.N.W. (*true*), 16 miles to Serabar, all low barren sand, backed by high mountains in the distance. Four miles to the southward of Serabar is that part of the coast called Rarrat and Gubroo Sheikh.

Mundaloo.

MUNDALOO is 7 miles N.W. ½ N. (*true*) of Serabar: there is at this place a very small bay between the points of the coast reef, where boats anchor. The land hereabout is low and swampy, and a little within the beach is a salt plain, where the Bedouins come down with their camels to procure that article.

Ras Casar.

N.N.W. ½ W. (*true*), 18 miles from Mundaloo, is a projecting point of the land called RAS CASAR, 1 or 2 miles to the southward of which is a bight or bay, called Brassy. The shore reef about here projects nearly 2 miles off the coast, with breakers; and within the outermost part between the patches are 3 or 4 fathoms, where buggalows anchor: the coast is low and sandy, backed by high land.

Aboo Yahbis.

N.W. ¼ N. (*true*), 5½ miles from Ras Casar, is ABOO YAHBIS, a low bushy cape with small white sand hills: from thence the coast trends away to the South and North-west, forming small bays of shoal water, with islands in front of them, upon the coast reef, *viz.:*

Sale Bar.

SALE BAR, a small rocky island off Aboo Yahbis: to the N.W. of it a rather large, but low bushy island, for which we have no name. The next is a small sandy island, with the highest part to the eastward, called Ras Abeed: it is separated from the main by a narrow channel of shoal water, affording protection for small craft, there being 1, 2, and 3 fathoms in it.

Ras Abeed.

Eree Island.

To the N.W. of this island is Eree, about 4½ miles in length, North and South, of very irregular shape, measuring nearly 14 miles. This island is low and sandy on the east part, but on the western part are the ruins in coral rock of the ancient Ptolemais Theron: the highest part is a mound of ruins which is visible from Ras Abeed, from whence it is West 3 miles. Many tanks were seen there.

There is a bay formed on the west side of the island, with 3 and 4 fathoms, mud, the former depth being pretty close to the island. The entrance into this bay is along by the north side of Eree, passing between the western extreme of that island, and Ras Furragene to the N.W. of it; but there are only 2 and 2½ fathoms in the entrance, on a bar formed on a continuation of the coast reef from Ras Abeed, whence it runs along the east and north sides of Eree, and then off from its westernmost point to the islands of Core Nowarat.

Quoin Hill.

Quoin Hill is a near range of sand hills 4 miles from the beach; Round Hill is to the West of it, and about 6 miles from the beach; Sugar-loaf is a rugged steep hill in the first range of highland.

## DESCRIPTION OF CORE NOWARAT.

This is, without exception, the finest bay in the Red Sea; its breadth from Ras Istye to Ras Furragene is 4½ miles, and it is nearly the same in depth from Furragene island; but the island of Badour is in the centre of it, so that a channel is formed round that island. In the outer part the soundings are from 4 to 6 fathoms, mud: in the inner part, where vessels anchor, there are 4 fathoms towards the island, gradually decreasing to 3 and 2 fathoms near the main. The outer part of the bay is bordered by a chain of low sand and coral islands, which effectually keep out the swell of the sea: they are formed upon coral reefs, and there are a few bushes or small trees on some of them. The northernmost of these islands is JESEERAT GOOBAN, a low coral island; the most elevated of the whole to the S.E. of it are the Hadjarah Islands, three in number, and situated upon one reef. A little within them is JESEERAT SHETEVO, and to the S.E. of it an island nearly 3 miles long, called Furragene; these two are also situated upon one reef, which is connected to the coast reef off Ras Furragene, upon which are two or three other small islands. There are also some small islets between Badour and Furragene Islands, and a shoal easily discernible just to the West of Shetevo Island; and two small islands in a swampy bay West of Ras Istye.

BADOUR Island, or AGGEEG KEBEER, is 2½ miles long, and three-quarters of a mile broad, formed of coral rock, with a low sandy plain on the West; on the eastern part it is rather woody. The village of Badour is a small place, consisting of about 60 huts, and a square stone mosque, and a little West of the town, on the margin of the island opposite the ship's anchorage, is a small tomb. About a quarter of a mile from the village are some stone tanks, cut out of the solid rock, but most of the water found in them was very brackish, nor could better be found either on the island or the main. *Badour Island and village.*

Sailing in to Core Nowarat, the only proper entrance for ships is between Gooban Island and the Hadjarah chain to the S.E. of it, then round Ras Istye, and steer S.W. by S. (*true*) to clear the shoal off Shetevo Island; then in passing round the western point of Badour Island, give a small spit off it a berth, and anchor in 4 fathoms S.W. (*true*) of the village. *Directions for Core Nowarat.*

There is a channel between Furragene and Hadjarah Island, through which the *Benares* sailed; but it is very narrow, and cannot be recommended for ships, there being a quarter less 3 fathoms in some parts. Small vessels proceeding from Core Nowarat to the southward find this a convenient channel during northerly winds, or coming into the Core from the South with southerly winds, as it shortens the distance in and out, as well as time in working through the North Channel.

Fishing boats find a channel in from the S.E. by crossing the reef between Furragene Island and Ras Furragene.

There are no supplies to be obtained here, so that the only advantage to be derived from this excellent harbour is the protection it affords in stormy weather.

The coast surrounding the bay is low and sandy, and the high land approaches within 5 miles of the coast, and perhaps spots might be found where wells could be dug, and a sufficient supply of good and wholesome water be obtained. The following is a description of the hills from Badour:—

Saddle Peak, or Sugar-loaf, is the southernmost detached hill of the near range to the South of Badour, and resembles a sugar-loaf. Rugged Double, or Hummock Peak, is a remarkable rugged-topped hill to the westward of the former. Bluff Peak is to the N.W. of the last, and in the same range, being about 10 miles from the beach, and is the highest northern part of the mountains to the S.W. of Badour. Chimney Hill is a high remarkable mountain on the most distant range in the same direction as the last. Quoin Hill is a small peak in the north part of the near high range to the West of Badour. Mound Hill is a low double-topped hill by itself to the westward of the near high range of land surrounding the bay, and approaching the entrance to Badour, for which it is a good mark; it looks like an island. *Saddle Peak. Hummock Peak. Bluff Peak. Chimney Hill. Quoin Hill. Mound Hill.*

N.W. ½ N. (*true*), 3½ miles from Ras Istye, is RAS SHAKKUL, and N. 54° W. (*true*), 12½ miles from Ras Shakkul, is RAS ASSEASE, the coast between forming a deep bay with soundings of 12 to 6 or 5 fathoms. From 2 to 3 miles West of Ras Shakkul are the two Amarat Islands; they are low and sandy, with a few bushes upon them, situated upon a coral reef; a small islet lies on it also to the south of the easternmost island, and a little beyond it a rocky patch. Between these and the cape land is a passage to AGGEEG SEGGEER, a small island in the bottom of the bay, bearing S.W. by W. (*true*), 6½ miles from Ras Shakkul. This island, with a small tongue of land to the westward of it, forms an anchorage in 5 or 4 fathoms, and half a mile from the beach are some wells dug in the sand, containing brackish water in the dry season. About one mile from the beach, in the direction of Quoin Hill, are some remarkable ruins in a straight, narrow line, 1½ miles in length, and from 20 to 60 feet wide; they are situated upon raised ground, sloping from the centre to either side, and there are many graves. About 5½ miles N.W. by W. (*true*) of the tongue of land at Aggeeg Seggeer is a similar one running to the North, with a reef, on which are some islets, and another to the eastward of it; this place is called Barrat Dodom; and from this tongue to Ras Assease it is 7½ miles N. ¼ E. (*true*). *Ras Shakkul. Ras Assease. Amarat Islands. Aggeeg Seggeer.*

From Ras Assease the coast runs N. 53° W. (*true*) 14 miles to a projecting point of the coast, and from thence N.W. by W. 11½ miles to Ras Mucdum. The land all along the coast from beyond Ras Assease is a very low sandy shore, with a layer of soft mud beneath it, and continues of the same description several miles inland; but after passing the above-mentioned projecting point of the coast, there are a few sand-hills.

Ras Mucdum.

Trickatatah Anchorage.

A mile or so to the south of Ras Mucdum is Trickatatah, off which place there is anchorage in 6 fathoms inside a reef, which bears from it N.E. by N. (*true*), about 500 yards. This part of the coast is low barren sand, full of salt water swamps, and some parts covered with bushes, but no fresh water known to be procurable. Within a narrow woody neck of land is a deep bay of shoal water, the entrance to which forms a small bay for boats; but ships must anchor to the East of this narrow neck of land, between it and a breaking reef called GUTTAL KENNARSHAR, where they will have 6 fathoms. About 4 miles S.E. ½ E. (*true*) from Ras Mucdum is a rocky spot called GUTTAT TROMBA, and 3 miles N.N.W. (*true*) from it is RAS MUGDA.

From Ras Mugda to Suakin.

Mersa Sheikh Saad.

From Ras Mugda to Suakin the direct course is N. 41½° W. (*true*) 32 miles, but the coast between forms a bight, encumbered with reefs and shoals. Close to the East of Ras Mugda is a shoal patch, and close to the North of it are some islets. A projecting point, consisting of sand-hills, lies 5 miles W. by N. (*true*) from the Ras, the coast between forming a bight. From this projecting point to Mersa Sheikh Saad is N. 60° (*true*) W. 13 miles, the coast also forming a bight, in which is Buchat Island, and another to the westward of it; the former is situated on the shore reef, which extends from Ras Mugda towards the projecting sandy point, whence it suddenly turns off to N.E. 2 miles, forming a point, and thence westward, with some islets on it, 7 miles, where it suddenly turns in S.S.E., and forms a bight close to the shore. From thence it runs up along the coast to Suakin, extending from half to 1½ miles from shore all the way, having however some breaks in it. The first of these breaks is 7 miles N.N.W. (*true*) from Mersa Sheikh Saad, and is called MERSA HADOO; and 2 miles further is another, called MERSA LEGAKINDE: North (*true*) of the latter 3½ miles is MERSA ENTABEEL, which is 7 miles S.S.E. (*true*) of Suakin.

Mersa Hadoo, Mersa Legakinde, and Mersa Entabeel.

Suakin Core.

SUAKIN.—The Core of Suakin is bordered by a reef of rocks, between which, in the narrowest part, it is about 150 yards broad: its depth is little more than 2 miles. In the entrance of the Core there is a depth of 21 fathoms, mud; and it is open with the south mosque bearing S. 46° W. (*true*), when Warrantor Hill will be about West. The soundings throughout the channel are mud, and the depth decreases gradually on approaching the town: the widest anchorage is to the North of Sheikh Abdallah tomb in 6 to 8 fathoms, mud; but that off the town, between the landing place and S.E. part of the above island, is the most convenient. There is a ruined tower on the north side of the entrance.

Suakin Town.

Ulgaff Town.

The town of Suakin is built of madrepore, and is situated upon a small island of the same name; the houses are very small, seldom containing more than one room, though some few have also an upper room with a veranda; for supplies it has to depend upon Ulgaff, situated on the main at the bottom of the Core. The water between them is shallow, and there is constant communication between the places throughout the day by ferry-boats. Ulgaff is much larger than the town of Suakin, and consists of grass huts surrounded by compounds; it has a bazaar, in which a few cattle may be had occasionally, but fire-wood, milk, ghee, coarse mats, jowarri, grass, and butter, were the principal articles; fish is very scarce. Good water can be obtained at a moderate price; it is brought from about a mile beyond the town on donkeys.

The Core lies in a S.W. and N.E. direction, and the general winds are either land and sea breezes, or blow in a line with the coast, inclining off the land at night, and from seaward early in the forenoon. By weighing at sunrise the *Palinurus* was always able to lie close hauled out of the Core, keeping the weather side on board; and by so acting she has sailed in and out four times; in March and June, 1830, January, 1831, and June, 1833. The reef bordering the Core is easily seen, and there is a rock or two above water at the entrance.

WARRANTOR is the highland just to the northward of Suakin; it is the largest conical hill in the first range, and forms with two small knobs when seen off the place. Farther North, off Mersa Quoin and Shab Dammart, its summit forms the lower section of a truncated cone; and from Jeseerat Abdullah the whole of it appears in the shape of a neat's tongue.

## INNER CHANNEL TO SUAKIN.

Commencement of the Inner Channel.

THE shabs or reefs that form the inner channel to Suakin, and thence northward, commence off RAS MUGDA. At 3 miles N. by E. (*true*) from that projecting point of land is an islet on the S.E. point of the first reef, which extends thence about 16 miles to the W.N.W., its western edge forming, with the coast reef, the narrowest part of the inner channel. The entrance is between the islets off the cape and the islet just mentioned, at 3 miles N. by E. (*true*) from it, which is still rendered narrower by a curved reef running from S.E. to S.W. from the islet, reducing the entrance between it and the islets to little more than a mile: the inner edge of this reef extends from the islet W. by N. (*true*) 3 miles, with several small islets on its edge, where it forms a bight to the North, and thence in a curve bending northward, it runs 7 miles to the westward, to within half a mile of the coast reef; and to the northward forming the narrowest part of the channel, in which are 10 fathoms, the

breadth being about a quarter of a mile. Between the south edge of this shab and the coast reef, after passing the entrance, and before arriving at the narrowest part, the breadth is from 2½ to 3 miles, with good depth, but there are some shabs and patches in it to be avoided, and which will be best understood by a glance at the chart.

From the islet on the S.E. point the outer edge of this shab runs N.W. ¾ W. (*true*) 11 miles, marked by rocks, with 10 to 14 fathoms close to; there is one island on its edge, about 7 miles from the islet, called SUMAR. From its N.E. point it runs West 7 miles, and thence away to S.S.W. towards the shore reef opposite Mersa Sheikh Saad. Great part of this north edge of the shab dries at low water, and is called Ul Shubuc, there being from 4 to 16 fathoms close to it.

Nearly 4 miles N.W. by N. (*true*) from the aforesaid islet on the S.E. point of the shab, and rather more than a mile from the edge of the shab, is a reef, about a mile in length, called GAAD HOGEET; there is deep water near it, and it may be passed on either side by vessels proceeding either to or from Suakin; but the best passage is between it and a reef with two islets on it, lying 4 miles N.N.E. ½ E. (*true*) from it, the depth between being from 14 to 18 fathoms. There are 2 fathoms on the north part of the reef with the two islets, and 1½ miles N.W. from it is the south end of a shab, which extends 3 miles North, and is one mile wide; between these are 17 and 18 fathoms; on the north end of the shab 5 fathoms, and 18 fathoms close to it. The reef with the two islets lies N. ¼ E. (*true*) 9½ miles from Ras Mugda, and the north end of the shab in 5 fathoms lies 23 miles S.E. by E. ½ E. (*true*) from the entrance of Suakin. *Gaad Hogeet.*

Rather more than 3 miles North from the N.W. part of Ul Shubuc is the S.E. point of a cluster of shoals and islets, which extends from thence 4½ miles W. by N. to within 1¼ miles of the shore reef at Mersa Hadoo, which is the breadth of the inner channel at that part, the depth therein being from 9 to 34 fathoms. From this point the boundary of this cluster turns to N.E. by N. 2½ and E.N.E (*true*) 2½ miles to its N.E. point, which is nearly 5 miles N. by W. from its S.E. extremity. This is called the GAD ETWID Reefs, from a dry sand-bank of that name on its N.E. extremity. To the S.E. and South of this bank are three similar ones, two of which are GAD ALLI and GAD DARAH; there are many patches of breakers and sunken rocks between these, and also throughout the cluster, but there is no navigable passage between them, although there are some spots of deep water. *Gad Etwid Reefs.*

E. by N. (*true*), 3½ miles from Gad Etwid, is ETWID ISLAND, small, but surrounded by a reef, and to the South of it half a mile is another rather larger island, also surrounded by a reef. At half a mile East of the latter island is a breaking patch, and at 1½ and 3 miles to the southward of it are two patches of 5 and 6 fathoms, with 20 fathoms between them, and 19 fathoms close to the southward. Between Gad Etwid reefs and Etwid Island is a passage 3 miles wide, with 16 to 26 fathoms in it. *Etwid Island and adjacent Reefs.*

To the N. and N.W. of Etwid Island, from 1 to 2 miles, are two breaking reefs, and 4 miles further N.W. by W. is another, with 19 to 25 fathoms between. This latter reef bears E.S.E. 6 miles from the entrance to Suakin: it has four small breaking patches to the East and N.E. of it, and four larger ones between it and the Gad Etwid reefs; the latter patches lie from 2 to 3¼ miles from the coast reef, and there are from 5 to 45 fathoms between. *Reefs to the northward of the Gad Etwid cluster.*

Although the principal part of these reefs and patches may generally be seen in the day, if a good look-out be attended to, nevertheless a look at the chart will show that the inner channel is preferable.

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Having given a description of the reefs and dangers near the coast, and forming the inner channel to Suakin, we shall now return to the southward, and describe the islands, shabs, &c. lying off the coast between the parallels of 18° 20′ N. and 19° 25′ N.

The southernmost of these islands is DAHRAT ABBEED, in lat. 18° 21½′ N., lon. 38° 51¼′ E., and bearing N.E. ½ N. (*true*), distant 20 miles from the point of Aboo Yahbis. N.N.E. 10 miles from Dahrat Abbeed, is Gurb Miune, surrounded by a reef, and 2 miles W. by S. from it is Miune, also surrounded by a reef, and 160 fathoms close to its S.W. side. W.S.W. (*true*), 4 miles from Miune, is DERRAHKAH, surrounded by a reef, and no bottom at 80 fathoms close to the northward of it. EDDOM SHEIKH is also surrounded by a reef, with 90 fathoms close to it: it lies nearly North 6½ miles from Gurb Miune, and 3 miles to the westward of it is GURB ABBE EASAH. Three miles North of Miune is DAHRAT DUGGELET, surrounded by a reef, with no bottom at 90 fathoms near it. DELGABE, surrounded by a reef, lies 13 miles N.N.W. ½ W. (*true*) from Dahrat Abbeed, and 5 miles N.W. ¾ N. (*true*) from Derrahkah; and N.E. by E. ½ E. (*true*), 4½ miles from Delgabe, is another island surrounded by a reef, and called EASAH ABBE. This group of nine islands are all low coral and sandy spots, from half a mile to two and three hundred yards across, with a few bushes upon them. Between Gurbe Abbe Easah, Eddom Sheikh, and Dahrat Duggelet, is a reef a-wash, lying in a North and South direction 1½ miles, with no ground at 60 fathoms on its eastern side; and N.N.E. ¼ E. (*true*), 4 miles from Dahrat Abbeed, is a small patch of one fathom, called Suffenot Shoal, with no bottom at 40 fathoms close to the westward of it. *Dahrat Abbeed. Gurb Miune. Miune and Derrahkah Islands. Eddom Sheikh. Gurb Abbe Easah, Dahrat Duggelet, Delgabe, and Easah Abbe Islands. Reef a-wash. Suffenot Shoal.*

The AGGRAB ISLANDS are situated upon a dangerous coral reef, which is 6½ miles in length North and South, and 5½ miles East and West, including patches in its neighbourhood. There are six small islands, or more properly sand and coral banks, on this reef, upon which when there is a swell the sea breaks heavily. The three northernmost are called the AGGRAB ISLANDS; the two next southward the Gurb Islands, and *The Aggrab.*

Gurb, and Abboo Murina Islands.

the easternmost the Abboo Murina. The water is very shoal on this reef, caused by pinnacle coral rocks, and there is no bottom at 40 fathoms between them, and close to the westward of Gurb Island. The northernmost Aggrab Island is 13 miles N.E. (*true*) of Ras Shakkul; the southernmost Gurb Island and Abboo Murina bear N. 60° E. (*true*) from the same Ras at the respective distances of 12 and 14½ miles; and Abboo Murina bears about W. by S. 12 miles from Derrakah Island.

About 4 miles to the southward of the Gurb Islands, and from 9 to 12 miles to the eastward of Ras Shakkul, is a rocky bank of 7 to 16 fathoms, with 40 and 50 fathoms between it and the shore; and 3 or 4 miles further to the E.N.E. there are 8 and 10 fathoms, with no bottom at 30 and 40 fathoms very near.

Darah Terass Island.

DARAH TERASS is a low, sandy coral island, lying N.N.E. ¼ E. (*true*) 12 miles from Ras Assease; it has 26 fathoms close to it, and 20 fathoms midway between it and the main land. E.S.E. ¾ E. (*true*), 6 miles from Darah Terass, is a dangerous rocky reef.

Tellahtellah Seggeer Island.

N.W. ½ W. (*true*), 14½ miles from Darah Terass, and E. by N., 15 miles from Ras Mugda, is TELLAHTELLAH SEGGEER Island, surrounded by a reef, with 17 fathoms near its S.E. side, and 5 near the N.W. side, and at the distance of 6 miles N.N.W. ½ W. (*true*) is a bank of 5 or 6 fathoms, with 10 fathoms on the S.E., and 30 fathoms on the N.W. side.

Tellahtellah Kebeer Islands.

E. by N., and more northerly from Tellahtellah Seggeer, at the distance of 9 miles, are the TEELAHTELLAH KEBEER ISLANDS: these are three low sand and coral islands, having at a distance the appearance of being only one; they are covered with bushes, and the extent of the reef on which they are situated is 3 miles North and South, and about 2 miles broad. From Tellahtellah Seggeer to these islands, the soundings are regular, increasing from 7 to 28 fathoms, and then gradually decreasing to 20 fathoms, after which they are irregular towards the islands on rocks and sand.

Timershear Island.

N.E. by E. ½ E. (*true*), 19 miles from Tellahtellah Seggeer, is the Island Timershear, a low sand and coral island, where anchorage may be obtained in great necessity; it is surrounded by a reef, and there are 6 to 12 fathoms near its south side, but the island is too small to afford any protection from swell.

Undee Sellee and Locha Islands.

About E. ½ S. (*true*), 17 miles from Timershear Island, is that of UNDEE SELLEE, a low, circular coral island, about half a mile in diameter. W.N.W. of this island, nearly 2 miles, is a patch of rocks. About S.E. ½ S. (*true*), 5 miles from Undee Sellee, is LOCHA, also a low circular island, about half a mile in diameter, with 67 fathoms at a short distance from its south side. Shab Locha is a breaking reef, above a mile in extent, lying 8½ miles S.W. from Locha Island, and N.W. by W. ¾ W. (*true*), 18 miles from Eddom Sheikh Island.

Shab Locha.

Mussarmroo and Gurram Mussarmroo Islands.

E. ½ S. (*true*), 7 miles from Locha, is the Island Mussarmroo, in lat. 18° 50′ N., and lon. 38° 51½′ E.; and S.E. by S. (*true*), 2 miles from it, is GURRAM MUSSARMROO: they are both low sand and coral islands, with bushes on them. There is no ground at 90 fathoms close to the former: at 1½ miles South of the latter there are 40 fathoms.

Barmosa Seggeer and Barmosa Kebeer Islands.

BARMOSA SEGGEER is in lat. 19° 3′ N., lon. 38° 17′ E., and bears N.W. ½ N. (*true*), 9 miles from Timershear: this island is about half a mile long, composed of coral and sand. N. ¼ W. (*true*), 10 miles from this island, is Barmosa Kebeer; this island is about three-quarters of a mile in length, in an east and west direction, and is also composed of sand and coral, with a few bushes. There is a reef at about a mile to the N.W. of this island, and no bottom at 100 fathoms close to its south side.

Barcoot Island.

About W. ½ S. (*true*), 9 miles from Barmosa Kebeer, is Barcoot, a low sand and coral island, without anchorage, there being no bottom at 135 fathoms close to its south side. There are four large breaking reefs, extending nearly 5 miles to the northward of this island; the second is called SHAB BARCOOT, and the northernmost SHAB COOTAB. The latter bears W.N.W. ½ W. (*true*), 10 miles from Barmosa Kebeer, and S.E. by E. ½ E. (*true*), 8 miles from Hinde Gedam.

Shab Barcoot and Shab Cootab.

Sale Addar Kebeer Island.

West, 15 miles from Barcoot, is SALE ADDAR KEBEER, a small sand and coral island, lying 22 miles E. by N. (*true*) from the entrance to Suakin; there is no bottom at 120 fathoms a short distance to the S.E. of it.

Sale Addar and Hinde Gedam Islands.

N.E. by E. (*true*), 7 miles from Sale Addar Kebeer, is SALE ADDAR ISLAND, of similar description; and about 2 miles E.N.E. of it is a rocky patch. HINDE GEDAM Island is about 4 miles N. by E. of Sale Addar: this is a low sand and coral island, and so steep, that there is no bottom at 220 fathoms close to its south side. It is in lat. 18° 21′ N., lon. 37° 57⅓′ E., and bears from the entrance of Suakin N. 66° E. (*true*) 31 miles. About 2½ miles E. by S. (*true*) from it is a rocky patch, and a similar patch at about the same distance W. by S. from it, with no bottom at 57 fathoms close to the westward of it.

Shab Mobiyett.

Shab Amber.

About 3½ miles to the West of Sale Addar Kebeer, is SHAB MOBIYETT; it is a narrow reef, about 18½ miles N. 75° E. (*true*) from the entrance to Suakin. Shab Amber begins to the North of the former, and extends 3½ miles northward, having deep water close to; its north end bears N. 65° E. (*true*), 19 miles from the entrance to Suakin.

Shab Gusser.

Shab Toueel.

S.W. ½ W. (*true*), nearly 5 miles from Shab MOBIYETT, is SHAB GUSSER, about 1½ miles East and West; and about a mile to the southward of it is Shab Toueel, upwards of 1 mile long, in a N.W. and S.E. direction, bearing nearly East from the entrance to Suakin, distance 14 miles.

Shab Munkar.

About 11 miles to the eastward of Shab Toueel is a breaking patch, called Shab Munkar.

## COAST OF NUBIA, FROM SUAKIN TO CORE DULLOW, WITH THE ISLANDS AND REEFS.

N. by W. ½ W. (*true*), 4½ miles from the entrance of Suakin, is MERSA QUOIH, the entrance to which is narrow, and the anchorage small, but the water is smooth, and the depth 8 or 9 fathoms, mud. Should a small vessel find it necessary to anchor here, she should drop her anchor as near to one side as possible, as no great range of cable can be veered out. At this anchorage Warrantor bears S. 66° W. (*true*). Mersa Quoih.

One mile further North, the *Benares* anchored in 14½ fathoms to the South of SHAB DAMART, so called from a Mersa for boats in its vicinity. It is a projecting part of the coast reef, with indifferent anchorage on the north and south sides. To the South of the dry part of the reef are some rocky patches, on one of which 4 fathoms were found, and some of them are nearly dry. Warrantor bears from the anchorage S. 62° W. (*true*). Shab Damart Anchorage.

Nearly 9 miles N. by W. ½ W. (*true*) of Suakin is MERSA AHTAH, a small core in the coast reef, with a narrow entrance, forming an anchorage for a buggalow: to the northward of it 3 or 4 miles are some small islands, inside the coast reef and close to the shore, where fire-wood may be obtained. Mersa Ahtah.

Nine miles further N. by W. ½ W. (*true*) is JESEERAT ABDULLAH, in which there is good anchorage in 7 fathoms, soft mud, Little Haddar Owwee Hill bearing S. 74° W. (*true*). This place has little protection for ships, and within the above anchorage are some straggling patches of rock; there is also one in the entrance, on which 5 fathoms were found, and there may be less. Bullocks, sheep, and goats, can be obtained here; fire-wood may be had for cutting, and there is a well of brackish water about three-quarters of a mile from the beach, and just to the left of Little Haddar Owwee Hill from this anchorage. Jeseerat Abdullah.

HADDAR OWWEE HILL is just to the South of Jeseerat Abdullah; it is at that anchorage hidden by a peak on the near high land, but towards the South it shows as a round hill. To the North of the peak on the near high land is a small hill, like Haddar Owwee when seen from the South, and therefore has been named Little Haddar Owwee.

N. by W. ½ W. (*true*), 9½ miles from Jeseerat Abdullah, is the entrance of MERSA SHEIKH BAROUD, in which the *Benares* anchored. This Mersa is called after a chief of that name, the ruins of whose tomb are on the north point of the entrance. The Core is formed by a gap in the coast reef, by which it is also bordered, and extends inland 3 miles. The soundings in mid-channel are mud, decreasing gradually from the entrance: when abreast of the place, the notch in Azzood Trelor bears S. 83° W. (*true*). The *Benares* anchored just within the ruined tomb. Sheep and goats can be procured here; there are also some springs of good water on the south side of the Core, about a mile from the beach; but as the road is very bad for casks, it is advisable to be provided with skins for holding water, to be conveyed to the boat on camels or asses, which may be obtained for that purpose for a trifling sum. Mersa Sheikh Baroud.

AZZOOD TRELOR, West of Sheikh Baroud, is the highest land immediately north of Haddar Owwee, and has a remarkable notch in its top, by which it may be known. Azzood Trelor.

Shar Kerrib, the next high land to the above, has its top in the shape of a saddle, and Haddle Ourl is a peak under it, when seen from Geehye, but to the North of it at Sheikh Baroud, and South of it at Mersa Duroor. Shar Kerrib.

MERSA GEEHYE is about 3 miles North of Mersa Sheikh Baroud, and is formed by the coast reef and two or three low swampy islands; it is very narrow, with deep water close to its edges; the anchorage is contracted, and the depth 9 or 10 fathoms. To sail in, keep close along the weather side, and anchor near the weather shore, in order to have room to veer cable. From the entrance, Azzood Trelor bears S. 76° W. (*true*). Mersa Geehye.

MERSA DUROOR is nearly 12 miles North of Mersa Geehye, or 42 miles from Suakin, in lat. 19° 49′ N. The anchorage is formed in the coast reef, with a rocky shoal off it, and some low swampy islands. There is a channel on either side of the shoal off its entrance, but the northern one appears to be the best: the soundings in mid-channel are mud, and decrease gradually. The best anchorage is just within the outermost island, in 3½ or 3 fathoms, from whence Saddle Hill, or Shar Kerrib, bears N. 80° W. (*true*). A little to the N.E. of the entrance of the Mersa are some rocky patches, on which the least water found was 5 fathoms. Wood and water may be procured, although the latter is not considered quite so good as that at Suakin; but it is more convenient, being about half a mile from the beach, and is brought down in goat-skins upon asses. Bullocks, sheep, and goats, are also to be had. Mersa Duroor.

N. by W. ¾ W. (*true*), 12 miles from Mersa Duroor, is MERSA FEDGER. This Core is formed by a break in the coast reef, in the bight of which there is good anchorage in 13 fathoms, mud. Within this Mersa Fedger.

anchorage is a sandy spit, forming a small bay, in which there are 6 and 7 fathoms water, but the channel into it is narrow. There is a shoal which forms the south side of the entrance of this Core, and extends along the coast reef in patches to Mersa Arroors, which is 1 mile to the southward, and is an anchorage for boats only; on this shoal is a 1-fathom rock, with 5 or 6 fathoms between. To enter Mersa Fedger, keep close along round the point of the reef forming the north side of the entrance. Goomud Rhabul bears N. 83° W. (*true*). Wood may be cut here, and bullocks may be obtained.

Goomud Rhabat.

GOOMUD RHABAT, the most conspicuous land on this coast, is a high conical mountain, with a crooked peak on its top; it is just to the North of Mersa Fedger, does not alter its appearance, and may be seen from the South of Jeseerat Abdullah to the Island of Macowa.

Mersa Owee Terree.

North, 8½ miles from Mersa Fedger, is Owee Terree: this Mersa is a gap in the coast reef, 600 yards wide at the entrance, and about the same depth, with 26 fathoms, mud, in mid-channel, which decreases to 8 fathoms close to the reefs. Country boats anchor here close in, but there is no protection for ships. Off this anchorage Goomud Rhabal bears S. 80° W. (*true*).

Mersa Arrakea.

MERSA ARRAKEA is 12 miles to the North of Mersa Fedger, or 65 miles from Suakin. The coast from Owee Terree has some rocky patches near its reef, and the entrance to this place is surrounded by them, with deep water close to it. This anchorage is narrow and encompassed by a reef, which, with northerly winds, make it necessary to keep the weather side of the Core close on board. In mid-channel, the soundings are 12 fathoms, mud, and there is smooth water with all winds. The ship's anchorage is on the eastern side of a small coral island, which is in the entrance to a small bay of 6 and 7 fathoms. The channel into this Core is to the northward of the largest shoal off its entrance, with the mouth of the Core open, leaving two small patches on the right hand, Goomud Rhabal being then on with the south end of the island in the bay, bearing S. 74° W. (*true*). It is reported that excellent fresh water may be obtained here.

False Chimney Hill.

FALSE CHIMNEY HILL is to the North of Mersa Arrakea; it is just seen off Sheikh Baroud as a high mountain, with a rugged top, assimilating to chimnies, from whence it is so named. Its range appears to be East and West. Off Owee Terree and Mersa Arrakea it appears as a sharp peaked mountain like a sugar-loaf, and at Salaka its top is seen just above the south brow of a round, elongated mountain, which is known by a remarkable piece of land a little South of it, called Table Hill; this is the lowest piece of land near the coast a little below Salaka.

Table Hill.

Salaka.

SALAKA is 14½ miles to the northward of Arrakea, or 79 miles from Suakin; when off this place, Table Mound bears S. 77° W. (*true*). There are some rocky patches near the coast reefs, about 6 miles South of it, and the narrow part of the channel, between the coast and outer reefs, is only half a mile south of this place. There is a projecting sandy spit, bordered by the coast reef, and a small bay formed to the westward of it, between the sandy spit and some sunken rocks to the southward of it (whose discoloured water may be seen in clear weather), in which is an anchorage in 9 or 10 fathoms, mud, surrounded by sunken patches of rocks. This is what Captain Courts called Mousetrap Bay. The channels leading to it are narrow; that to the eastward is close round the sandy spit reef, avoiding some small patches off its edge a little outside the spit, and passing between them and the larger patch to the southward of it. The South channel is inside the sunken rocks to the S.E. of the sandy spit; it is a little wider than the eastern channel, but the eye through both can be the only guide. The least water the *Benares* had in these channels was 3 fathoms, rocks, but between the sandy spit reef and shoal to the S.E. of it there are 9, 8, 7, 6, 5, and 4 fathoms.

Salaka Outer Anchorage.

Those who do not wish to go into this intricate place may obtain anchorage outside the sandy spit, upon the South of its reefs, but the water deepens quickly off it; the *Benares* anchored in 3½ fathoms, rocks and sand, and when brought up was in 10 fathoms, rocks and sand. This anchorage is very indifferent, with bad holding ground, and will not answer in southerly winds; it is also doubtful if the inner anchorage is protected from them by the surrounding patches of sunken rocks. There are no supplies of any description to be had here.

Little Salaka.

LITTLE SALAKA is a mile to the southward of Salaka, and is only a narrow break in the reef, which leads into a small bay, full of shoals, a fit anchorage for nothing larger than boats.

Mallago or Chimney Hill.

MALLAGO, so called by the natives, or CHIMNEY HILL, is to the West of Salaka; it is a high rugged-topped mountain, approaching the appearance of chimnies more than that named False Chimney Hill. It has the same appearance throughout, and is seen from Mersa Fedger to Macowa Island.

Duberdabb.

DUBERDABB is 12 miles to the northward of Salaka. The Tyflah islands are to the southward of it, and between them and the main is the channel in, which is only half a mile wide, and the anchorage bears from the north part of the island N. 78° 38′ W. (*true*), 2 miles. This anchorage is small, but the soundings

are mud, and good protection from northerly winds may be found by anchoring close up inside the point of the reef. There is a remarkable dark hill in the range nearest the coast, and the Funnel Hill appears open to the northward of it at this anchorage.

FUNNEL HILL, so called from its similarity, is to the West of Duberdabb, in the southern extreme of Jibbel Trebur, and is shut in behind the sugar-loaf at Macowa. Funnel Hill.

JIBBEL TREBUR is a high, distant mountain above Duberdabb, beyond the second slope. On its top, northward, are two small rugged elevations, the northernmost of which is seen from Owee Terree to Core Dullow, where it shows as the highest part of land to the southward. Jibbel Trebu .

SMALL PEAK, on the near hills, has a flat top, and is a little to the North of Jibbel Trebur. Sugar Loaf is a peaked mountain in the range between Jibbel Trebur and the coast, and is a little to the North of the Funnel Hill above mentioned. Small Peak.

The TYFLAH ISLANDS are about half a mile from the coast, near Duberdabb, and consist of three or four sandy patches with a few bushes on them; they are surrounded by shoal water and sunken patches of rock; but anchorage may be had under the westernmost sandy patch against northerly winds, in from 10 to 4 fathoms, very irregular soundings; and protection against southerly winds may be found, in irregular soundings of 5 to 14 fathoms, $1\frac{1}{2}$ miles North of these islands. Tyflah Islands Anchorages.

About 9 miles to the northward of Duberdabb is CORE MAKAFAL; it is formed by a narrow break in the coast reef, and has good anchorage for buggalows; but neither wood nor water can be obtained. Nearly 2 miles to the south of it is LITTLE MAKAFAL, with a breaking patch $1\frac{1}{2}$ miles to the eastward of it in the channel towards Macowa, which here is nearly 4 miles wide, and forms the best entrance to Dohana. Core Makafal.

MACOWA ISLAND is $6\frac{1}{2}$ miles long nearly, North and South, and about $1\frac{1}{2}$ broad, at the distance of 4 miles from the coast, and nearly parallel thereto. Its south point is in latitude 20° 44′ N., longitude 37° 20′ E. It is rather high table land, composed of rocky sandstone, in steep cliffs, apparently worn away by the heavy rains. It has a very sterile appearance, there being nothing to relieve the eye, but rocks, barren sands, and innumerable shoals, excepting on the south point of the island, where there are a few mangrove trees. The remains of two rough but dry wells were found on the north end, but no vestige of a tank or any other ruin. The island is surrounded by a coral reef, which extends 3 miles off the north end, and forms the south side of the eastern entrance to Dohana Bay. A rocky spit extends a mile off from the south end, with anchorage in 12 fathoms on its S.E. side. Anchorage is also to be had on the west side of it in any depth required. Macowa Island.

MYETTA is a small, high, barren island, 3 miles to the East of Macowa, situated upon the S.E. part of a coral reef, $4\frac{1}{2}$ miles long, and nearly 2 miles broad; it has another small island upon it, 1 mile N.W. of Myetta. This reef extends nearly a mile South of Myetta; and 2 miles S.S.W. of this island is a sunken patch of rocks, and about 4 miles from it, upon the same bearing, is a $1\frac{1}{2}$-fathom patch of rocks. These two patches, which are $1\frac{1}{2}$ miles apart, form the entrance to Macowa from the sea; and the southern high part of Macowa, about W. $\frac{3}{4}$ N., should lead through between them. There is a channel between Myetta and Macowa Islands, with many sunken patches in it. Myetta Island.

DOHANA BAY is formed by Ras Roway and reef, which extends southward from it, from the south extremity of which it runs inland to the N.N.W. nearly 20 miles; the south part or mouth of this bay is encumbered with small islands, reefs, and shoals. The part more particularly called Dohana Bay is situated on the west side of this extensive bay at the distance of 18 miles N. by W. and N.N.W. from Core Makafal. It has good anchorage, and the water is better than that generally met with on the coast. The well is about a mile from the beach, to which the water casks may be rolled and filled, or the water may be purchased of the natives; but neither fresh provisions nor firewood are to be procured. The eastern entrance to this bay is about half a mile wide, the south part being bounded by the reef off the north part of Macowa, and on the North by the extreme point of Red Roway reef; the depth between being 18 fathoms. Having passed this, the breadth increases to more than a mile, but again becomes narrower in what may be called the western or inner entrance, formed by a sand-bank on the N.W. part of Macowa reef and a small island off it: this is also about half a mile wide. After passing through the inner entrance, the soundings will be from 12 to 4 fathoms, until abreast of the third island, where they deepen; but there are many patches for which the eye can be the only guide; having passed the third island and its extensive reef, a course about N.W. will carry the ship to the anchorage at Dohana, which is a little to the northward of a cluster of sandy islands, off which are some rocky patches of 2 fathoms. Dohana Bay. Dohana.

The Channel inside Macowa, leading to it, is safe, as the patch in the south part of it, off Little Makafal, can be seen, and the soundings decrease towards the N.W. part of that island, affording an opportunity of anchoring conveniently. Macowa Channel.

The *Benares* through the Eastern Channel to sea.

The *Benares* sailed out through the eastern channel from Dohana, and as the channel is intricate and dangerous, it has been thought proper to give an account of the proceedings in their own words:—

"May 29. Weighed early this morning from Dohana, and after clearing the islands and patches of 2 fathoms, which are 2 miles from the anchorage, we steered just to the East of the third island (which is connected to the second by the shoal water), and anchored in 7 fathoms, amongst a number of patches off the eastern entrance, and about 1 mile north of the extensive reef off the north part of Macowa Island: the extreme south point of Ras Roway reef bearing E.S.E. (*true*), and the entrance distant three-quarters of a mile; the extremes of Macowa, S. 10° W. to S. 20° E. (*true*).

"May 30. Weighed with a light northerly wind, and proceeded through the eastern entrance; in standing out, we had 10, 6, and 5 fathoms, rocks and sand. From thence we worked through a maze of reefs, with deep water between, and in the afternoon anchored under the lee of a reef, on its edge, in 9 fathoms, rocks and sand, about 1 mile to the East of Ras Roway, which forms a bluff on the highest land hereabout."

RAS ROWAY lies $10\frac{1}{2}$ miles, about N. $\frac{1}{4}$ E. (*true*), from the north end of Macowa Island. Between Myetta Island and Ras Roway there is a continued mass of rocky patches and deep narrow channels, including two small sandy islands, situated to the north-eastward of that island. The easternmost of these, called Oomul Grushe, is 7 miles N.E. by E. from Myetta Island; the other, called Shab Baryer, is 3 miles to the westward of it, and is situated upon the south end of an extensive reef, which runs 4 miles to the northward, and on which the H. C. sloop of war *Nautilus* was wrecked in 1833.

Oomul Grushe. Shab Baryer.

From 1 to 3 miles East of Ras Roway are three small shoals or sand-banks, and 2 miles E. by N. (*true*) of a sandy cape, which is 2 miles to the northward of Ras Roway bluff, there are two dangerous sunken rocks.

Shab Kummere.

Twelve miles N.W. $\frac{1}{2}$ W. (*true*) from the above-mentioned sandy cape is the S.E. end of a reef called Shab Kummere, which extends nearly 5 miles N.W., and is only 1 mile off the coast, which, to the south-eastward of it, is steep to. There are a few patches between this shab and the coast, which can be seen by a good look-out.

Eight miles N.W. $\frac{1}{4}$ W. (*true*) from Shab Kummere is CORE MISHMISH; there are two breaking patches about 2 miles off the coast between, and another, considerably larger, about $2\frac{1}{2}$ miles N.E. of the entrance. There is also a dangerous sunken rock, lying at a distance of 6 miles, in nearly the same direction, from Core Shenab, on which the sea breaks sometimes: between these two latter there are no soundings. This is the outer danger hereabout, and is nearly 6 miles from the land; it lies in latitude 21° 25′ 15″ N.

Core Mishmish, or Shenab.

MISHMISH, or more properly Core Shenab, is 35 miles to the northward of Core Makafal. RAS ROWAY, situated between them, is considerably to the eastward of these places, and from the sandy cape, 2 miles to the northward of Ras Roway, CORE SHENAB is 23 miles N.W. $\frac{1}{2}$ N. (*true*). This core is formed through a gap in the coast reef, and extends between 3 and 4 miles inland: it is upwards of 200 yards wide at the entrance, with a depth of 30 to 15 fathoms, decreasing as you advance inwards. A vessel may run in with a fair wind, but there is no working room in it. The best mark for this core is Quoin Hill on with two small paps on the highest part of the land within; or it may be found by the breaking patches to the N.E. of it, which will be on with Abboo Hummummah, when bearing N.W. by W. (*true*); and from the south part of these outer patches the entrance is to the S.W. 2 miles. There is neither wood, water, or fresh provisions to be had here.

Core Dullow.

Nearly 5 miles to the N.W. of Shenab is CORE DULLOW, and although it runs nearly as far inland, it is only about 200 yards wide, and is also a gap in the coast reef, having in the entrance from 18 to 15 fathoms. A vessel with a fair wind may run in here and anchor, but there is no room for working. About 2 or 3 miles to the N.E. of this place is a breaking reef, called SHAB DULLOW, from the south part of which Abboo Hummummah bears W. by N.

Shab Dullow.

Abboo Hummummah. Haycock Peak.

ABBOO HUMMUMMAH is a table-topped hill to the northward of Dullow, in a range near the coast, which continues to the southward, and terminates in small straggling hummocks, a little to the southward of Core Mishmish. Haycock Peak is the southernmost but one in the above range.

Quoin Hill.

QUOIN HILL is to the northward of the last mentioned; it has a piece of land curiously projecting from its southern brow, which is the highest, and is situated at the upper part of Core Mishmish.

The Paps.

The Paps are a notch in the centre part of the highest hill, to the westward of Mishmish.

## GENERAL DESCRIPTION OF THE OUTER REEFS AND THE INNER CHANNEL, FROM SUAKIN TO CORE DULLOW.

The land throughout this tract is high and mountainous in the interior, of barren aspect, and decreases in several ranges towards the coast, and at 6 to 10 miles from it, terminates in a broken ridge of hills on a sandy plain, partially covered with short furze and tufts of bad grass, which extend to the sea, without any appearance of cultivation.

The OUTER REEFS forming the Inner Channel along this coast are generally 2 and 3 miles from it, excepting in the neighbourhood of Jeseerat Adbullah, Salaka, Duberdabb, and Ras Roway, in the latter of which places they approach within half a mile. The outermost parts of these reefs is twelve miles off the coast, and are in patches, with deep water between. Outer Reefs.

The first cluster extends from Suakin to four miles to the southward of Sheikh Baroud, or to the parallel of 19° 31′ of north latitude. Between this and the parallel of 19° 36′, or about 1 mile to the North of Sheikh Baroud, where the reef again commences, is the First Outlet into the open sea. First Cluster. First Outlet.

The second cluster of reefs continues so far as the parallel of 19° 44′, or 5 or 6 miles to the northward of Meersa Geehye, and extends about 10 miles off the coast. To the North of this cluster is the Second Outlet, which terminates off Mersa Duroor, or in latitude 19° 48½′. These the natives speak of as the principal outlets in this neighbourhood. Second Cluster. Second Outlet.

Close under some of the above reefs anchorage may be found; but the ports on the coast being only 12 to 14 miles apart, will perhaps, in most cases, preclude the necessity of resorting to them. One of these anchorages is between Shab Damart and Mersa Quoih, in 25 fathoms, mud; a second is to the S.E. (*true*) of Jeseerat Abdullah, in 20 fathoms, mud; a third is to the N.E. of Geehye, in from 9 to 16 fathoms, sand.

From the outlet terminating off Mersa Duroor, the outer reefs extend in patches to the distance of 10 miles off the land, and cease a little to the southward of Mersa Fedger, or nearly to latitude 20° 0′, the inner part being distant from that port about 2 miles, and from thence is the Third Outlet, which extends up to the E. by S. of Owee Terree, or to the parallel of 20° 7′, but there is a rocky patch about 2 or 3 miles from the coast in the centre of it. Third Cluster. Third Outlet.

The outer reefs continue from the E. by S. of Owee Terree to the northward, and commence in the south part with a shoal called SHAB SUADY, about 4 miles off the coast, which is upwards of 6 miles in extent, its north extreme being to the eastward of Mersa Arrakea. On the inside of this shoal are many patches of sunken rocks, and the reefs continue in this way to the northward with small channels to the open sea, none of which are frequented or considered safe, until to the N.E. of Arrakea, where there is an opening about half a mile in extent, with some patches of sunken rocks in its neighbourhood, and therefore is not to be recommended, although frequently made use of by the native boats proceeding to Jiddah.

With moderate northerly winds, these boats can reach that port from it, and therefore an interval of one or two days' fine weather induces them to take advantage of this opening, in order to avoid the narrow and intricate parts of the Inner Channel off Salaka, and to the northward of that place. When the winds are fresh, it is usual to work from port to port daily on this coast, until up with Macowa, from whence they proceed across to Jiddah.

Anchorages on rocks and sand may be obtained under many of the outer patches between Duroor and Fedger, and on those from Owee Terree to the northward, particularly to the N.E. of Arrakea, under the south part of the reefs in 10 fathoms, rocks and sand. Anchorages.

From the outlet terminating to the N.E. of Arrekea, and which is not here enumerated amongst the principal channels, the outer reefs extend in patches to the parallel of Salaka, or to 20° 26′ N. latitude; and three miles to the southward of that anchorage they are more numerous, and approach nearer to the shore, the channel being reduced to the southward of that place to half a mile or less in breadth, with some sunken rocks on the east side of it, which are near the largest reef on that side; and when Table Mound is shutting in with the top of the False Chimney Hill, a good look-out should be kept for them. The first sunken rock is about a mile to the southward of Salaka, and to the southward of this sunken rock two patches will be seen, which may be passed on either side, but the in-shore channel is the widest. To the N.E. of these, off the end of the largest reef, is another sunken rock.

If the weather is cloudy, it will at times be difficult to discern the sunken rocks and patches: it will then be advisable to remain at anchor at Salaka, or some other place about the reefs, until it clears up. If coming from the southward, anchorage may be found in 7 or 8 fathoms, rocks and sand, under the two small patches already mentioned, to the westward of the largest reefs bordering the narrowest part of the channel, about 2 miles to the southward of the sandy spit at Salaka.

Between the parallels of 20° 26′ and 20° 31½′ N. is the Fourth Outlet from Suakin, being 5 miles broad to the open sea. Fourth Outlet.

From the latter parallel, at 9 miles to the S.E. (*true*) of Duberdabb, where the reefs again commence, they continue in patches to the northward to lat. 20° 43′. This cluster approaches within half a mile of the coast, a little to the southward of Duberdabb, and the outermost patch, called GUTTAL EL BUNNA, is 10 miles N. 81° E. (*true*) from Duberdabb, and 9 miles S. 58° E. from the sandy point of Macowa Island.

Fifth Outlet. The Fifth Outlet is about 2 miles wide between the two rocky patches lying at 2 and 4 miles S.S.W. from Myetta Island. From the northernmost of these the reefs continue to the northward to lat. 21° 3′ N., including all those about Macowa and Ras Roway already described.

From the two dangerous rocky patches lying E. by N. (*true*), 2 miles from the sandy cape, to the northward of Ras Roway, up to the Core Dullow, there are only three small clusters. One is 12 miles N.W. from the sandy cape, and is called Shab Kummere; it is narrow, and forms a channel between it and the coast, one mile broad, with several small sunken patches in it near to the reef. The second is N.E. (*true*) of Core Mishmish, or Shenab, and from 2½ to 3 miles off shore. The third is Shab Dullow, lying N.E. (*true*) of Core Dullow, from 2½ to 5 miles off shore. Between Shab Kummere and the reefs off Shinab are also 2 small patches. There is also a single sunken rock, lying 6 miles N.E. (*true*) of Core Shinab.

## THE COAST OF NUBIA AND EGYPT, FROM CORE SHENAB TO THE ISLAND OF SHADWAN, AT THE ENTRANCE OF THE STRAITS OF JUBAL.

Core Shenab, or MISHMISH, is an extensive inlet on the coast of Nubia, in lat. 21° 21′ N., lon. 37° 7′ 30″ E., or 2° 7′ 30″ W. of Jiddah by several chronometers, and has already been described in page 358. It was here the Honourable Company's surveying vessels, *Benares* and *Palinurus*, commenced their surveys, one to the northward and the other to the southward. This inlet is the southernmost of nine which lie on the coast to the northward of it. Core and Shab Dullow have also been described.

From the outermost dangerous rock to the N.E. of Core Shenab (in latitude 21° 25′ N.), N. 5° 30′ W. (*true*), and in lat. 21° 39′ N., there is a small dangerous reef, the outer one of several which lie to the westward; this small reef lies 12 miles from the shore, in lon. 37° 11′ E., and has no soundings near it. From this again the next outer danger is a large reef, of 2½ miles in length, its southern end in lat. 22° 0′ N., and lon. 37° 5′ E. Between these two last-mentioned reefs there are no dangers, except what lie 3 or 4 miles to the westward, among which anchorage may be found, as well as at the latter large reef, which is nearly connected with an extensive range of reefs, extending from this to the shore, distant 8 or 9 miles, which here forms a cape, with a range of small hills on it.

Elba Cape. Elba Mountains. South Peak. This Cape I shall name ELBA CAPE, from a range of conspicuous high mountains in the interior, called by the natives Elba, distant from the cape 24 and 25 miles. The southern and highest hill on this range is by measurement 6,900 feet elevation. I have called it South Peak; it is in latitude 21° 53′ N., and longitude 36° 33′ 45″ E.

Between Elba Cape and Core Shenab, any of the inlets on the coast afford good anchorage for ships, taking care to avoid the numerous detached reefs off the coast 3 or 4 miles; even under many of these reefs anchorage is to be got, the eye-sight being your guide.

Elba Cape is in latitude 22° 3′ 30″ N., and longitude 36° 56′ E.

From the outer large reef off Elba Cape, as just described (in lat. 22° N., and lon. 37° 5′ E.), draw a line at N. 36° W. to lat. 22° 53′ 45″ N., and lon. 36° 22′ E.; this point is the eastern and outer extreme of a very large reef 3 miles from East to West, and it is the southern and outer reef of what was formerly called in the old charts Foul Bay, but it is named by the natives SHAB ABOOFENDERAH. It has anchorage on its south side, but studded with numerous small patches of rocks; there is also a small rock about 20 feet high on its eastern extreme, probably the remains of an island, the other part being washed away. Having drawn the line between Aboofenderah reef and the outer reef off Cape Elba, it just touches the outer reefs between these two points, extending and detached from the shore. Their positions remain to be described, as follows: one small reef, lat. 22° 10′ N., 2 miles to the West of the line, and the same distance from the shore: in lat. 22° 15′ 30″ N., one mile to the West of the line and 5½ miles from the shore, are two small reefs: in lat. 22° 35′ 30″ N., just on the line, is the outer reef of a group, on a bank of soundings, extending 20 miles to the N.W., as far as the Seeall Islands; these reefs are very dangerous, having numbers of detached rocks about them; however, if a small vessel is in want of anchorage she may find shelter under most of them. The coast from Elba Cape is low near the sea; gradually rising inland, it takes a N.W. direction to a coral cliff cape, of moderate elevation, called Raz Juzreeal: there is an excellent harbour close to the southward of this cape, called MERZA HELAIB. A vessel wishing to anchor there must haul close round a sandy island, nearly attached to the cape, and then haul up to the northward between a reef and the island; the passage is narrow, but when clear of the reef you may stand to the S.W. into a beautiful harbour, where a vessel may anchor in 5 or 6 fathoms, one quarter of a mile from the shore. Good water is to be procured here at some wells about 500 yards from the beach; firewood is plentiful; sheep are also numerous, and to be obtained from the natives, who are civil and obliging. The coast from Ras Juzreeal takes a direction N. 48° W. (*true*) to latitude 22° 40′ N., which is due South from the Seeall Islands: to seaward is studded with innumerable reefs and rocks.

Shab Aboofenderah. Juzreeal. Mersa Helaib.

ELBA ISLAND, a small low coral island, in latitude 22° 24′ N., and longitude 36° 34′ E., is situated on the body of an extensive reef, or reefs, by which it is surrounded; anchorage may be found on some spots, or breaks, in this reef, but sunken rocks are numerous about it. Elba Island and reefs.

The Seeall Islands are three in number, low and sandy, and partly covered with bushes; they are between eight and nine miles from the nearest part of the coast, surrounded by numerous rocks and reefs, with intricate passages among them. The eastern Seeall Island is the largest, being about 2 miles long from East to West; these islands are the residence of numerous fishermen of the Hootainy tribe; the large island is in latitude 22° 47′ N., and longitude 36° 17′ E., and can be seen at times from the large reef Aboofenderah, 7½ miles N.E. by N. (*true*) from Seeall Island. Seeall Islands.

ST. JOHN'S ISLAND, or SEBERGET by the natives, in lat. 23° 36′ 20″ N., and lon. 36° 14′ 30″ E., is a small high island, of about 700 feet elevation, and of a circular form; the hill in the centre of the island forming a remarkable sharp peak of volcanic origin; this island was formerly famous for its emeralds, but now is the lonely abode of one or two fishermen, who are constantly on the look-out for turtle, which are very numerous hereabouts, and valuable from their shell. The island neither affords water nor vegetable production, being dreadfully barren; it is steep on all sides, having no soundings near the band of coral reef which surrounds it, or, more properly speaking, which constitutes its base. During the survey of the Red Sea, the Hon. Company's surveying vessel, *Palinurus*, held on this island during a north-wester, by hooking the kedge anchor to a hole in the reef, and making fast to it. Three miles to the south-eastward of St. John's, there is a small steep rocky island, with no soundings near it. St. John's, or Seberget Island. Rocky Island.

FOUL BAY, the southern point which lies to the West of St. John's, and to the N.W. of Aboofenderah Reef; this place is full of reefs and sunken rocks; a line drawn N. 51° 48′ W. (*true*) from Aboofenderah Reef in lat. 22° 53′ 45″ N., and lon. 36° 22′ E., touches the outer boundary of reefs to the N.W., till this line is crossed by another drawn from St. John's, S. 43° 30′ W. This last line clears the reefs to the West. St. John's Reef lies in latitude 23° 26′ 20″ N., and longitude 36° 4′ E., or 14 miles to the S. Westward of the island; others lie to the S.W. and West of this outer reef. A line N. 21° W. (*true*) from this outer reef, clears to the eastward 3 and 4 miles the outer boundary of the reefs in the northern part of Foul Bay, which is bounded on the north side by Macour Island and promontory of Ras Benass. St. John's Reef.

MACOUR, or EMERALD ISLAND, bears from St. John's N. 56° 32′ W. (*true*), distant 23½ miles, and is in latitude 23° 50′ N., and longitude 36° 52′ 30″ E., and distant between 3 and 4 miles from the low sandy cape at Ras Benass; the island is small, not being above a mile in length, and about 100 feet high in the centre, composed of one mass of coral, and affords no anchorage, bottom not being found. It is surrounded by a coral reef, which, off the N.W. end, extends half a mile from the island. Macour, or Emerald Island.

RAS BENASS:—the body of this cape, on which are some moderately elevated hills, lies in lat. 23° 56′ N., and the outer extreme of the cape, in lon. 35° 52′ E., is a low sandy point running out to the south-eastward. On the east side of the cape there is no bottom at 30 fathoms close to the shore; on the western side there is an extensive reef running off to the southward, as far as the parallel of Emerald Island; off the extreme point of the reef are numerous small reefs and rocks, with irregular soundings between them, from 8 to 30 fathoms. The channel between this reef and Emerald Island is 1½ miles broad, with overfalls from 7 to 12 fathoms rocks. A vessel coming in through this channel must be cautious not to come too close to the sunken rocks and reefs off the cape, till in deep water; she may then work up to the anchorage N.N.E. to the head of the bay, and anchor in 10 or 12 fathoms, about 1 mile from the shore, well sheltered from all winds, the low sandy cape off Ras Benass S.E. ½ E. (*true*), distant 3¾ miles. In working up care should be taken not to come too near to the low sandy cape, on account of the numerous rocks near it. From this anchorage, 13 miles West in the bay, is a small sandy island situated in the bight; on the west side of this there is good anchorage in 7 and 8 fathoms rocks. On the mainland near the anchorage, are some ancient Egyptian ruins nearly covered with sand, and supposed to be the remains of the city of Berenice. Ras Benass. Cape Reef. Anchorage in Ras Benass Bay. Anchorage.

Near the beach in Foul Bay is a range of high remarkable peak mountains called Berenice Mountains, which are seen some distance at sea; the northern and highest one of this range is 4,440 feet high, and lies in lat. 23° 34′ 15″ N., and lon. 35° 25′ E.

From Ras Benass the coast runs W.N.W. (*true*) 7 or 8 miles to a point, off which there are two small reefs, distant from the point about 2 miles; the land there forms a deep bay, having no soundings near the shore. In latitude 24° 9′ 45″ N., and longitude 35° 45′ E., there is a large reef called the Fury Shoal, and several small ones to the N.W., the outer one distant from the main 9 or 10 miles. There is anchorage in 6 or 7 fathoms rocks, on the south part of Fury Shoal, but it is very bad holding ground, and difficult to approach, being studded with small rocks. Fury Shoal. Indifferent Anchorage.

From the Fury Shoal a line North 31° 20′ W. (*true*) clears all the dangers, which extend only a few miles from the coast of Egypt to Cosire, and will be mentioned as follows:—to the W.N.W. (*true*) of the Fury Shoal, and on the main land there is good anchorage called MERZA WADDY LEHUMA, in lat. 24° 12′ N., in 7 or 8 fathoms; Merza Waddy Lehuma.

under the lee of a low point, off which a narrow reef projects to the southward, between which and the main a vessel may anchor. E.N.E. (*true*) of this anchorage 9 miles, in lat. 24° 13′ and 24° 14′ N., and lon. 35° 39′ 30″ E., there is a cluster of small reefs, with no soundings close to them; and 9 or 10 miles to the N.W. is another cluster, with numerous detached rocks in the channel between them.

Mehabesse, or South Island.

MEHABESSE, or South Island, is the southernmost of four low sandy islands, situated near the main land, and lying nearly North and South from each other. South Island lies in lat. 24° 19′ N., and lon. 35° 17′ E., distant from the main, to which it is joined by an extensive reef, $1\frac{1}{2}$ miles long. These islands, the northern one of which, called Seeoul, is in lat. 24° 23′ 30″ N., are surrounded by extensive reefs, with narrow passages between them, which are studded with rocks. Along the outer or eastern edge of the reef there is no bottom at 30 fathoms close to the rocks. To the southward a vessel may anchor in 8 or 10 fathoms water between South Island and the main: there are two small reefs to the S.E. of South Island, about 1 mile distant, and two small patches E. by S. (*true*) $3\frac{1}{2}$ miles.

Seeoul Island.

Anchorage within South Island.

In latitude 24° 12′ N., and in lon. 35° $4\frac{1}{2}$′ E., is a remarkable high mountain, the peak of which can be seen, in clear weather, 90 or 100 miles, and is frequently seen in passing up the centre of the sea. In latitude 24° 29′ 30″ N., and longitude 35° 22′ E., is a small reef, with several sunken rocks near it, $4\frac{1}{2}$ miles from the shore, and 3 miles from the northern extreme of the reef joining the four islands to the south-eastward, with overfalls from 14 to 30 fathoms, between the patches of rocks. RAS OOMUL ABBAS, in lat. 24° 33′ N., is a low point, to the southward of which there is indifferent anchorage under its lee, close to the shore, in 10 fathoms, and good shelter from the N.W.: it lies nearly South from the ISLAND WADDEE JUMAUL, distant 6 miles, and can be easily known by a remarkable sugar-loaf hill close to the beach, which is 300 or 400 feet high.

Sherm Sheikh. Good Anchorage.

SHERM SHEIKH, in latitude 24° 36′ 30″ N., and 4 miles S.W. of the south point of WADDEE JUMAUL ISLAND, is a cove in the main land, the entrance to which is about 200 yards broad, the anchorage capacious at the further end in 10 fathoms sand and mud. Wood can be procured here close to the anchorage.

Waddee Jumaul Island.

WADDEE JUMAUL is a low rocky island, in lat. (the centre) 24° 39′ 30″ N., and lon. 35° 13′ 30″ E., $2\frac{1}{2}$ miles in length N.W. and S.E.: there is an extensive coral reef off the north end. The channel between the island and the main is dangerous, being full of small reefs and patches of rocks; off the south point there is a spit of shoal water, on which a vessel may anchor in 8 or 10 fathoms sand and rocks, with the centre of the island bearing North. E. by N. (*true*), from the island 5 miles, is a dangerous sunken rock, and another to the northward of the island 5 miles. With the island bearing S. $\frac{1}{2}$ W. (*true*) 7 miles, there is a small shoal in lat. 24° 46′ 30″ N. The coast about this part ought to be approached with caution, when within 15 miles of the land, as far as 25° of latitude.

Anchorage. Dangerous rocks. Shoal.

Ras Doorah.

Ras Doorah, in lat. 24° 53′ N., and lon. 35° 2′ 45″ E., is a low point of the main, with a long reef running parallel and close to it. To the North of the cape, 4 miles, there is a dangerous rock, and several other detached rocks, E.S.E. (*true*) 8 miles; this part is dangerous for ships. MIRZA TOONDEBAH, in lat. 24° 57′ N., and lon. 35° 0′ E., is an anchorage close in shore, where a vessel may anchor in 10 fathoms, under shelter of a low point, and a small reef projecting from it. E.N.E. (*true*) $3\frac{3}{4}$ miles from this anchorage there is a small reef, with anchorage on its S.E. side. In lat. 25° 4′ N., and lon. 35° 0′ E., there is a reef $2\frac{1}{2}$ miles from the shore, on the southern extremity of which a ship may anchor in from 10 to 18 fathoms, well sheltered from N.W. winds. In lat. 25° 12′ N., and lon. 34° 52′ 30″ E., anchorage will be found in a small, narrow cove, called Mirza Zebara, the entrance not more than 100 yards broad, but perfectly sheltered; to the northward of this lies the Elphinstone Reef, formerly discovered by Lieutenant Denton, in the *Palinurus*, in 1827, in lon. 34° 55′ E., and lat. 25° $18\frac{1}{2}$′ N. To the W.N.W. (*true*) of this reef, $5\frac{1}{2}$ miles, is indifferent anchorage, on the main land in Mirza Debah, between which and the Elphinstone Reef are several shoals and rocks, 3 miles from the shore. MIRZA MOMBARUCK, a good anchorage in lat. 25° 30′ N., and lon. 34° 43′ 15″ E., is a small bay, with soundings of 6 and 7 fathoms inside. Care must be taken in anchoring, as there is a sunken rock in the middle of the bay, visible from the fore-yard. RAS HUMROO is 4 miles N.W. of this, and is a bluff red cape. MIRZA TROMBEE, in lat. 25° 42′ N., and lon. 34° 38′ E., is an anchorage in 7 or 8 fathoms, a little sheltered from north-westers by a low point of the main: to the northward of the point are two small shoals close in shore, with soundings of 17 and 20 fathoms near them, as well as 3 miles to the eastward and N.E.

Mirza Toondebah. Anchorage on a bank. Good Anchorage. Mirza Zebara. Elphinstone Reef. Mirza Debah. Mirza Mombaruck. Ras Humroo. Mirza Trombee.

Ras Aboohadger.

RAS ABOOHADGER, in latitude 25° 58′ N., and longitude 34° 27′ 30″ E., is 11 miles below Cosire, bearing S. 34° E. (*true*) from the town. Off this cape there are two sunken rocks, distant from the shore 1 mile. There is a black hill, shaped like a cone, standing among a number of low sand-hills, about 3 miles in shore, which bears from the rocks W. 30° S. (*true*).

Cosire.

COSIRE, the town, in latitude 26° 6′ 50″ N., and longitude 34° 21′ 30″ E., is small, and contains about 2,000 inhabitants: the houses are low, and built on a sandy point, projecting a little from the line of coast:

a small Turkish fort occupies the more elevated ground at the back, or land side of the town, and can be seen by a ship at sea 10 or 12 miles distant. The coast, 8 or 9 miles North and South of Cosire, is very low; and a long line of moderately elevated hills, 5 or 6 miles inland, present no prominent marks to guide a ship into the port, more particularly at night time. A large hill, or distant high land, of about 4,500 feet elevation, is the most remarkable; the N.W. brow of it is the highest part, and bears from the anchorage S. 18° W. (*true*), distant 19½ miles; this hill can seldom be seen at night. Should a ship, making this port, not be certain of her latitude, it would be better to make the Brothers (hereafter described), and then, if N.W. winds are blowing, stand in for the coast, 7 or 8 miles to the northward of the port, then bear up close along it. A ship cannot be too careful not to get to the southward of the port; this has frequently been the case, and a few miles to the southward has taken 3 or 4 days to beat back; for when N.W. winds are blowing, a continued drain of current and heavy swell sets along, and some distance from the coast. If a ship by accident should get to the southward, she had better stand over to the coast of Arabia, and make her Northing there, than short tacks on the Egyptian coast. If a vessel makes the port at night, and does not intend to anchor, she ought not to heave to, but keep off and on under topsails, or she will drift to leeward. Should the wind be light, she may anchor on a small patch of soundings from 15 to 17 fathoms sand, which bears from the fort E. by N. 1½ miles, between which and the anchorage in the roads there are soundings of 45 fathoms. In anchoring at Cosire, the best place is close to the point of the reef forming the roads. Should the wind blow hard from the N.W., she may, by placing a grapnel on the reef, haul close up to it by a hawser, similar to the native boats, in a line of S.S.W. from the point of the reefs; the sand in the roads is shoal, having only 1½ fathoms water on it. Having anchored near the reef, another bower anchor ought to be let go to the S.S. Eastward, in case the wind should change to the southward, from which quarter it seldom blows hard, and there is little danger with a long scope of cable, and as the ground holds well, being sand at top and clay underneath. This place, in a few years more, will not afford shelter for boats, which are daily arriving to carry away the immense quantity of grain for Arabia; bringing as ballast a quantity of sand, which they are allowed to throw overboard into the roads, and is fast filling them up. The variation of the compass at this place is 8° westerly; high water full and change 6 hours; rise and fall 3 feet. Easterly winds are not to be dreaded here; being the sea-breeze, they are only light and pleasant, and bring with them little or no swell.

Remarkable hill.

How to make the port.

How to proceed with N. and N.W. winds.

How to anchor and moor at Cosire.

Variation of the compass, and time of high water.

THE BROTHERS are two small coral islands, situated in latitude 26° 21′ 25″ N., and longitude 34° 54′ 30″ E., and bear from Cosire N. 64° 00′ E. (*true*), about 33 miles distant; they are steep all round, and have no soundings between them; they may be seen 10 or 12 miles off. The coast to the northward of Cosire forms a straight line N.N.W. ½ W. and S.S.E. ½ E. (*true*) as far as latitude 26° 45′ N. is safe to approach and clear of dangers, except off one small anchorage called Gouay.

The Brothers' Islands.

A line from the outer roads of Cosire drawn N. 14° 28′ W. (*true*), clears all the dangers on the coast of Egypt to the northward as far as the Jaffateen Islands; to the northward of which has been included in the Straits of Jubal.

GOUAY is a small Bedouin village, in latitude 26° 21′ 30″ N., and longitude 34° 13′ E. Here is good anchorage for small craft close to the shore, among a cluster of small reefs and rocks, in 4 or 5 fathoms. Off this place are several dangerous reefs, with soundings between them and the shore; they bear from the anchorage N.N.E. (*true*) 2 and 3¾ miles, and lie in latitude 26° 23′ 30″ N., and 26° 25′ 00″ N., and from 2 to 3 miles off shore, with soundings about them to the North and N.E. 2 miles. The coast is then clear as far as Safadger Island, between which and a low woody point of the main, called Safadger Ulbur, are three small reefs in latitude 26° 40′ N., and the outer one in longitude 34° 7′ 30″ E.

Gouay village. Good Anchorage.

SAFADGER ISLAND, 5 miles long S. by E. and N. by W., and 2 miles broad at the northern part, lies between latitude 26° 43′ 15″ N., and 26° 48′ N., the body of it in longitude 34° 2′ E. The south end is a long, low, sandy point, and on the north end is a remarkable table-hill about 150 feet high. E. 7° 12′ S. (*true*) from this hill, distant 4¾ miles, lies a dangerous coral reef about a quarter of a mile in extent, with no soundings near it, in latitude 26° 46′ 30″ N. Two other reefs lie to the S.S.E. (*true*) of this last-mentioned reef, one distant 2 miles, the other 4½ miles, and is 6 miles off shore. This last reef is the outer danger near Safadger Island, and is called SHAB SHEAR, and is in latitude 26° 42′ N., and longitude 34° 9′ 15″ E. Safadger Island is situated in the centre of a deep bay, in which there is good anchorage both to the northward and southward of the island: the soundings are very irregular, from 5 to 25 fathoms sand and rocks. The best anchorage in this part of the bay is near the south point of the island: from the main an extensive reef projects out, and extends to the southward as far as the low woody point called Safadger Ulbur. The channel between the island and the main gradually decreases, until it becomes not more than 200 yards broad, and the depth of water 3 fathoms: it then increases until you pass the island, and enter the northern bay. The east side of the island is lined by a narrow reef, with no soundings at 30 fathoms close to it: off the north end a narrow reef projects in prongs to some distance. Between this reef off the north end of the island and the islets joining Ras Aboosomer, is the channel into the northern bay: but there is a shoal in the middle of the channel, which bears from the table-hill on Sefadger due North, distant 2¾ miles. In the upper

Safadger Island.

Coral Reefs.

Shab Shear.

Safadger Ulbur.

Ras Aboosomer islets.

Directions for the anchorage. part of this bay there are three small islets, two of which are connected together by a reef; haul round the outer of these two islets, and a vessel will find good anchorage between them and the main. The soundings are irregular, from 7 to 25 fathoms, sand and clay: the bay is sheltered from all winds. The channel between the above islets and reef is a mile and a half broad. RAS ABOOSOMER is in latitude 26° 52′ N., and due North from Table Hill on Safadger Island: this cape forms the north extreme; it is rather high and safe to approach, having no bottom at 30 fathoms close to the shore.

Ras Aboosomer, of the northern bay.

Sayel Hasheesh islets, or Aboo Mokhadige.

SAYEL HASHEESH, two small islets, the largest in latitude 27° 3′ N., and longitude 33° 58′ 30″ E., lying in the centre of a small bay formed by Ras Korah Bobah; there is anchorage in 10 fathoms close to the northern point of the bay, affording good shelter from the N.W. and northward.

The Jaffatine Islands. Great Jaffatine. Aboo Mungarah. Ras Salam.

The JAFFATINE, or JAFFATEEN Islands, are 5 in number, the southern part of the largest being in latitude 27° 12′ N., and longitude 34° 1′ 30″ E. The GREAT JAFFATINE is a long, narrow island, moderately high at the north part, its length about 5½ miles; between it and the main is a low woody island, called ABOO MUNGARAH, to which it is joined by an extensive reef, which extends off the north point of Great Jaffatine, in several prongs. The passage between it and Ras Salam (the point of the main) is not more than a quarter of a mile broad, and the soundings in it are extremely irregular; in passing through it in the Honourable Company's surveying brig *Palinurus*, we frequently had 25 and 30 fathoms, then 6 and 7 fathoms the next cast. The reef projects off the western side of the Great Jaffatine and gradually shoals towards it, on any part of which there is good anchorage in 5 or 6 fathoms, sand.

Good Anchorage.

Little Jaffatine. Aboo Tamalah. Mugomish Island.

The LITTLE JAFFATINE is a small, but rather high island, lying close to the eastern side of the Great Jaffatine; there is indifferent anchorage close to the southern end of the channel between the islands in 10 or 12 fathoms, rocks. A small island called Aboo Tamalah, bears S.E. (*true*) from the south end of the Great Jaffatine, distant 1½ miles; it is steep all round. There is a dangerous patch of rocks close to the south point of the Great Jaffatine, and another patch to the S.W., distant 1½ miles, or due West from Aboo Tamalah 2 miles, with soundings about them. There is also a small coral reef S. 5° W. (*true*), distant 2¾ miles from the south point of the Great Jaffatine, having soundings about it; between this shoal and the main, nearly in the centre of the bay, is a small, low island, called Mugomish, having an island on its S.W. point, and a spit of sunken rocks bounding its S.W. side. Between this island and the main is an extensive reef in mid-channel, in the extensive bay formed by the islands and Cape Korah Bobah, the southern point of the main. There is no bottom in mid-channel, and irregular overfalls as you approach the shore and islands. From the Jaffatine Islands to the northward the coast forms a deep bay as far as the Sea of Zeittee.

## GULF, OR SEA OF AKABAH.

Prevalent violent winds.

This part of the Red Sea, so little known formerly, has now been found to afford no advantage for a sailing ship: the advantages which might offer for steamers, in landing their packets at Akabah, is in a measure counteracted by the almost constant and violent northerly winds which prevail here. These winds are drawn to the southward by a very high range of mountains, bounding close both sides of the sea, and opening like a funnel to the northward in Syria; from which cause the cooler atmosphere of the northern regions is drawn into this part with such violence that it raises the sea into a deep and turbulent swell, so that no vessel could make way against it; the place also is void of soundings and anchorages, except one or two spots. No native vessels ever navigate this sea, and such a dread have they of this place, that in crossing the Red Sea, near the Sea of Akabah, the Arabs always offer up a prayer for their safety. Numerous vessels have been lost hereabouts, and four attempts were made before we succeeded in surveying it, the *Palinurus* having been blown away three different times; once while at anchor, having two bowers down, with 50 fathoms of chain on each.

Difficulty and danger of navigating.

Entrance to the gulf. Straits of Tirahn. Best entrance. Ras Furtuk and anchorage.

The entrance of the Sea of Akabah is nearly shut up by the island of Tirahn, and the extensive reefs connected with, and extending to, the East and West of this island, leaving one small channel to the West of Tirahn, one mile broad, and no soundings at 70 fathoms in it, called the Straits of Tirahn; and one to the N.E. of the island, one quarter of a mile broad. This is the best and safest channel, having anchorage throughout, which leads up to Ras Furtuk, the east point of the entrance to the Sea of Akabah: under this point there is good anchorage, and here a vessel may remain till the winds allow her to proceed up the gulf. At this point it is 7 miles broad, in latitude 28° 6′ N.; the sea then widens considerably, and the first anchorage is on the eastern shore, in a snug cove, with a narrow entrance, between 6 and 7 miles from the point last mentioned: this anchorage is called SHERM MUJOWAH. Fives miles further, good anchorage will be found in SHERM DUBHER. From this there is no anchorage on the eastern side till in latitude 28° 51′ 30″ N., which is about 10 miles North of a bluff headland and high mountain, called TYBUT ISSUM, which bounds the view on the east side, when seen from the lower and upper part of the gulf.

Sherm Mujowah and Dubher. Tybut Issum bluff.

Dahab.

DAHAB, or MERSA DAHAB (*i.e.* the Golden Port), probably the Eziongeber, mentioned in Scripture, is on the western side, or peninsula of Sinai, in latitude 28° 28′ N., and longitude 34° 37′ E., and N. 4° 56′ W.,

distant 33 miles from the Peak on Tirahn Island, and nearly East 29 miles direct from Mount Sinai. This point is formed by a sandy point, extending out from the line of coast nearly two miles, on the outer extreme of which is a large date grove: among the trees indifferent water is found in some wells. Near the date trees is a small bay or anchorage, affording shelter enough for boats; it is named Minna, but the anchorage for ships is on the south part of the cape, where the sandy point forms a horse-shoe shape to the westward. In this bay a vessel may anchor in 6 or 7 fathoms, perfectly sheltered from all winds. The date grove at Dahab is inhabited during the fruit season; but the Toorwarree Arabs return before the winter months for pasture in the valleys of the immense mountains, in the dreary peninsula of Sinai. The sandy points are all formed by the torrents, which at times wash out the sand from some of the larger valleys. Minna.

The next anchorage is on the same side, about 7½ miles to the N.N.E. (*true*) of DAHAB, under the lee of a sandy point, called RASARSER. A bluff cape projects out, called Windy Cape, but there is no anchorage there. Rasarser.

Nearly North of this cape, 7 miles, is Warsut, a low, sandy point, in latitude 28° 50′ N.: here is good anchorage from northerly winds. Warsut.

E. 6° 40′ N. (*true*) from Warsut, distant 8¾ miles, is an anchorage under a sandy point, called BEER UL MARSHY, in latitude 28° 51′ N.: a small patch of rocks surrounds this point, and extends a little to seaward, having deep soundings 1 mile off shore; there is good anchorage under this cape in 5 or 6 fathoms, well protected from northerly winds. Beer ul Marshy.

NOWEEBY, a low sandy point on the Sinai side, with a large grove of date trees on it, is 7 miles to the northward of Warsut, and about 10 miles to the north-westward of Beer ul Marshy; it is in latitude 28° 56′ 30″ N.: this spot affords good shelter from northerly winds, and indifferent water may be obtained among the date trees, where there are some wells. Noweeby.

ABOO RUMLAR, the northern point of a small bay, about 13 miles above Noweeby on the same side; this is the next anchorage, and is sheltered from northerly winds. It lies in latitude 29° 8′ N., and will be known by having a white patch or land drift on the lower hills, 2½ miles to the N.N.E. (*true*) of the cape. Aboo Rumlar.

Between this cape, or white patch, and the island called JUZERAT FAROUN, or Pharoah Island, near the head of the sea, there are three different anchorages from N.E. winds on the Sinai side; the first is North of White Cape 2 miles; the next North, a little easterly, 7½ miles from White Cape; the third N.N.E. about 11½ miles, all in small bays. The distance from White Cape to the opposite shore is 9 miles, where there is a small bay, with an island in the centre of it, called OMAIDER ISLAND; there is good anchorage between the island and the main, but, like all other anchorages, excepting Dahab and Mujowah Cove, is exposed to the southerly winds, which sometimes, in the winter months, change suddenly, and blow violently for a day or a few hours. Three anchorages. Omaider Island.

JUZERAT FAROUN, or PHAROAH ISLAND, about a quarter of a mile long, and 300 or 400 yards broad, lies in latitude 29° 24′ 30″ N., and from the fort and village of Akabah bears W. 25° 40′ S. (*true*), distant about 8 miles: the Island of Faroun is a barren rock, surrounded by an old Saracenic castle, now in ruins. In this castle are the remains of capacious water-tanks, all out of repair; this fortification occupies the whole of the top of the island, and has once been a strong place: it is situated about 400 yards from the main land, between which and the island there is good anchorage in 10 fathoms, sand and rocks. The Arabs at Akabah will bring supplies to this place in five or six hours, but they are not to be trusted. Juzerat Faroun, or Pharoah Island.

AKABAH is a small Arab village, in an extensive date grove, nearly at the head of the sea; close to the village there is a small square fort, garrisoned by 25 Turkish soldiers from Egypt: this is a depôt for grain, used by the caravans on their way to, and return from, Mecca. The fort is in latitude 29° 28½′ N., and longitude 35° 6′ E.; near the fort and adjacent country are numerous ruins, which we had not an opportunity of examining. From the fort of Akabah the head of this sea forms a circular bay, 3 miles to the northward and N.W., and the same distance across, but abreast of Faroun Island it is nearly 7 miles broad; the coast at the head of the sea is very low, being a sandy valley, called Waddy ul Araba, bounded on each side by high mountains. At the head of the sea there is good anchorage from northerly winds, and fresh water may easily be obtained by digging a few feet close to the beach; in anchoring at this place it must be recollected that southerly winds bring up a heavy swell. Akabah village.

## SHOALS, ETC. IN THE CENTRE OF THE RED SEA.

CENTURION SHOAL,* mentioned by Horsburgh to be situated in latitude 25° 20′ N., and longitude 35° 56′ E.

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* In the former editions of the Directory, this is described as a reef about 2 or 3 cables' lengths in extent, steep to, having 40 fathoms very near it. It is stated to have been seen by H. M. S. *Centurion*, and other ships, in lat. 25° 20′ N., lon. 35° 48′ E.

It certainly does not exist in this situation, or near it; having been on the spot assigned to it, and often, about it, nothing has been seen. Once when on the situation assigned to it, a shoal was reported from the mast-head, and it was not until we sailed over the spot that we found it was not a shoal, but a strong rippling, caused by currents, appearing in light winds exactly like a shoal. When in the rippling we sounded 200 and 400 fathoms, but found no bottom; on the north side of this rippling, which extended several miles to the N.E. and S.W. in a narrow line of breakers, we found the current setting to the S.E. one quarter of a mile per hour, and on the south side of the rippling $1\frac{1}{2}$ miles per hour to the N.W., the wind then very light or nearly calm. This appearance, so deceitful to us, having been three years constantly in sight of coral shoals, at once proves that former navigators must have seen the same, and placed them down as shoals, without examining them; which fully accounts for the numerous dangers in the old charts. None of the Arab pilots have any oral information of this shoal, nor do they believe it to exist; the Dædalus Shoal being the only one known to them.

Strong current, with rippling.

Dædalus Shoal, or Abdul Kheesan.

DÆDALUS SHOAL, or Reef, is a small reef nearly in the centre of the sea; it lies in latitude 24° 56′ N. and in longitude 35° 56′ 30″ E., by observations taken on it by an artificial horizon; and in one day's run by three chronometers, 42 miles East of the south end of Waddee Jumaul Island on the coast of Egypt, also 1° 26′ 30″ W. of Sherm Hussay, by chronometers. There are no soundings alongside the shoal, and, to obtain observations, the Hon. Company's surveying vessel *Palinurus* hooked on to it during the warm weather in the Red Sea, when its waters are much lower than in the months from October to May.

A sand-bank of several feet high is formed on this reef (but is yearly washed away when the sea rises, and the winds blow strong). This is the only reef in the centre of the Red Sea, and is called by the natives ABDUL KHEESAN.

### THE CENTRE CHANNEL OF THE RED SEA.

The centre channel between the outer extremities of the reefs extending off the Arabian and Abyssinian shores is very deep throughout, as we have sounded from 70 fathoms to upwards of a quarter of a mile, or 260 fathoms, without getting bottom.

This channel in the parallel of Jiddah, is 110 miles broad; from 20° of latitude on the Arabian side to 19° of latitude on the Abyssinian side, its breadth is about 70 miles. From the outer extremity of the mud soundings on the western part of Doharab, until soundings are again obtained on the eastern part of the Dhalac banks, the extent of deep water is not much more than 40 miles; and to the southward of Camaran, the deepest part of the channel, where we could not obtain soundings, is reduced to a narrow strip by the sand and mud soundings obtained off both sides of the sea; and from thence the narrow strip of deep water in an irregular form may be traced to the Straits of Bab-el-mandeb.

### INNER CHANNEL; ARABIAN SIDE, SOUTH OF JIDDAH.

This inner channel, from Jiddah to Leet, is formed by numerous sunken rocks, breaking patches and reefs, the south-westernmost of which is called Gad Amaze; and the coast is bound by coral reef. It is generally narrow until past Kishran, from whence is an open channel to sea, bound on the North by Gad Amaze, and on the South by the north part of an extensive bank of reefs and islands, running from thence to the southward. Within the above space the channel is only 2 and 3 miles wide, has very deep water, with some patches, and very indifferent anchorages, being mostly stopping places for boats, formed by breaks in the coast reef or rocky patches off it, affording little protection from the sea, even for buggalows. There are no towns on this part of the coast, nor any supplies procurable.

From Leet to Camaran the coast is generally bordered by coral reef, and the inner edge of the outer reef is formed by extensive sunken rocks, dangerous patches, and small islands, with deep water close to them, between Leet and Seraane Island; but, after passing the latter, it is generally clear, with good anchorages, though there are many sunken patches in it. A little North of El Burk the channel is contracted to 1 and 2 miles by a bank, called Ome Kergane, the north part of which is very shoal, but there are 2 and 3 fathoms on other parts. After passing this bank, which is extensive, the channel becomes comparatively open.

The best entrance from seaward is to the west of Leet; there is one between Loban and Entookfash Islands, over the tails of the banks; a third between Ockbane and Camaran Islands (pages 306-7). The south entrance to the inner channel is between Camaran Island and Ras el Bayath, being no more than 700 yards wide between the latter and a reef which extends towards it from the island. The boats sail night and day through these channels.

The principal places within this space are Leet, Coomfidah, Gheesan, Loheia, and Camaran.

### INNER CHANNEL, AFRICAN SIDE.

This channel is similarly bound as that on the opposite side, and ends at Dhalac Islands and Bank to the southward. The ISLAND BOLHESSOO, which bears N. by E. $\frac{1}{2}$ E. (*true*) from Ras Unduddah, distant 24 miles, may be considered the south entrance. The north entrance of this channel may properly commence at

Macowa, though this description extends it to Core Dullow, from whence to Suakin the channel is generally from $1\frac{1}{2}$ to 3 miles wide, except in the neighbourhood of Salaka Duberdabb, and Ras Roway, where the limits are half a mile. From Macowa to Salaka, which is the most intricate part of the channel, there are generally soundings, but in all other parts deep water.

From a little below Suakin the channel becomes wider, passing outside the extensive shoals in a bight of the coast South of Trikatatah, which is above 20 miles below Suakin, and soundings will generally be obtained; but, excepting the harbours on the coast, there are few places where ships would prefer to anchor, the bottom being generally rocky with great overfalls. In most of the anchorages North of Suakin it is advisable to moor the ship; and in many places it may be considered prudent to lay out, in blowing weather, the stream anchor on or near the weather beach.

There are several entrances to this channel from seaward, the best of which, North of Suakin, is off Sheikh Baroud. There is also a wide one North of the Dhalac Banks, but several patches are in it, most of which will be seen by a good look-out. There are also channels out to seaward over the Dhalac Bank to the North of Untoentore Island, but none below it, excepting the south entrance, bounded by Ras Unduddah and Dhalac Island reefs already described.

The principal places on the Abyssinian coast in the above space are Suakin, Core Nowarat, and Massowah.

## CHANNELS FROM THE CENTRE TO THE INNER CHANNELS.

In the channels amongst the islands and shoals there is very deep water to the North of 17° N. latitude; but from thence to the southward, from the northern extremities of the Dhalac Banks on the Abyssinian side, and Shab Farsan and Islands on the Arabian side, soundings may be obtained; those parts being composed of very extensive banks, with shoal water and moderate depths, intersected by narrow channels of mud with deep water.

In prosecuting the survey, we have been in the Honourable Company's ship *Benares*, from the nature of the duty, amongst all these islands, reefs, and banks, where the depth of water permitted, excepting that part on the Arabian side to the south-west of Aboo Laad Island, and also immediately above and below Sabyar and Gootna Islands, which was found too dangerous. I think few navigators will frequent the channels amongst the islands and reefs on the broadest parts of the banks to the North of 17° of latitude, on account of the deep water and great distance of either coast; which render it probable that they would not be able to procure anchorage before night-fall, and therefore would be obliged to heave-to amongst the reefs and islands for the night. But we used to make fast to the islands by hooking a grapnel on to the reef off them, and haul the vessel close up, and send the stream anchor on shore: twice the wind falling light, the eddy laid the ship's broadside close to the reef. On one occasion we veered clear, and on another set the sails to keep her off, but at last were obliged to get the anchors on board, and heave-to for the night.

The country boats make fast to the islands and reefs, either by means of a boat, or by a man swimming with the end of a hawser, and a hook, from the vessel to the reef, and hooking on to the rocks.

Should it ever become necessary to make use of these channels on either side, it will be requisite to make certain of the vessel's situation, so as to be at a moderate distance from the reefs at daylight, in order to have as much of the day as possible to run across with; and a sharp look-out must be kept for the sunken patches, some of which can only be seen in clear weather, and when the sun is in the opposite direction to the ship's course (see conclusion of Jiddah, page 326), and even then they will not get clear through before dark, without a six-knot breeze.

The country boats, small and great, frequent these channels. In fine weather, with moderate fair winds, they steer from Jiddah direct for Romea Island, on the northern part of the Dhalac Banks on the Abyssinian side of the sea: but if the wind is southerly, they keep their wind on the larboard tack, and pass in through the channels on the African side as the wind permits, and for the nearest of which they run direct, on the appearance of bad weather.

On fresh, fair, or foul winds they use the inner channels. If going from Jiddah to Suakin, or even to Massowah, they either cross to pass into the inner channel to the South of Macowa Island, or through one of the channels between the reefs South of it, and return in a similar manner. The boats bound to Massowah also frequently sail down the Arabian coast to near Kotumble Island; then quitting the inner channel, at daylight they proceed across the reefs passing the Simmer Islands, and when clear of the reefs they run across to make Romea Island with northerly winds, but with southerly winds they keep their luff, and cross in amongst the numerous islands on the Dhalac Banks to Massowah; from whence they return in the same way to Jiddah.

When we were running between the reefs to seaward, from Dahret Simmer Island, we saw in the forenoon a merchant boat coming in to the coast from the centre channel; and she must have made the outer parts of the reefs early in the morning. The ship and boat crossed each other with a half-fathom patch of rocks between them. We had the sun at our back, which was favourable to us, but not to the boat, and there was much glare.

## WINDS AND WEATHER IN THE CENTRE CHANNEL AND INCLUDING THAT PART OF THE SEA SOUTH OF 15° LATITUDE.

The N.E. monsoon, entering the Red Sea, becomes a S. Easterly wind, and, being repelled by the high land of Africa into a narrow strait, blows with considerable force, and rather inclining towards the Arabian coast; for it is probable they are stronger there than on the Abyssinian side, even in the lower part of the sea. These winds generally begin to decrease in force after passing the Harnish and Zoogur Islands in latitude 14°, and, as they approach the wider part of the sea, they are gradually lost in light winds along the outer reefs on the Arabian side, or turn to the westward amongst the banks and islands on the African side, and gradually unite with the prevailing northerly winds in that part.

The southerly winds commence in October, and subside in the latter part of May or beginning of June. They blow with most force from October to the end of January, and in some months extend so far as Suez, but most commonly do not reach Jiddah; they are frequently succeeded by light variable or northerly winds in the 18th degree of latitude. From February to the end of May they do not always blow so strong as in the preceding months, and are frequently succeeded by northerly winds for several days, particularly in the month of February, at which times the native boatmen avail themselves of the opportunity to quit, and reach the southern parts of the sea.

From October to January, in the lower part of the sea, the weather is generally thick and hazy, obscuring objects until pretty near; and along the outer reefs, squalls and rain are frequently experienced in November and December. From February to May the weather is unsettled, in April and May particularly. Below the 15th degree of latitude we experienced fresh squalls from the eastward, with heavy clouds of sand, and sometimes rain.

In the beginning of June the southerly moonson is succeeded by N. Westerly winds, which, in the lower part of the sea, seldom blow with great force. They continue pretty regular during June and July, and in August and September are frequently light and variable; in the latter month they are sometimes light southerly winds or calms. During this time the weather is frequently very thick and hazy, particularly on the Arabian side; and the Abyssinian shore is consequently much the most pleasant, and is considered the most healthy.

On the 20th of October, the pilot drew our attention to the Pleiades, which the Arabs call "Tryer,"* and which was then seen low down in the East; he informed us that, on its first being seen in that quarter in the evening, it indicated the commencement of the southerly winds. The latter part of April, in the evening, the Pleiades set, when he said it would be light variable winds for forty days; after which, it will be again seen in the East in the morning, when the N.W. winds commence, and continue until it again sets in the morning in the beginning of September, when there will be light variable winds for forty days, after which the southerly winds commence again, when it is seen in October early in the evening.

## WINDS AND WEATHER IN THE INNER CHANNELS.

In the inner channel on the Abyssinian side, northerly winds, inclining to land and sea breezes, seem the most prevalent all the year round; but most probably are, as in all other parts to the South, light and variable in August and September, when there are also frequent calms; and southerly winds are by no means common. From the month of August to October is generally fine weather, but from November to the end of March appears to be the rainy monsoon upon that coast. In April the weather was cloudy, and fine in May, June, and July; but between 19° and 20° of latitude in these months we experienced several hot winds and fresh land squalls; and, by Mr. Salt's journal, it appears that the *Panther* was driven from her anchorage, in latitude 15° 30′ N. at Massowah, June 20th, 1805, by a partial simoon, or sand squall.

There are similar winds and weather on the Arabian side; and though we had land and sea winds more frequently in March and April, the land squalls in the lower part of the sea occurred in April and May. From May to July, when we experienced them on the Nubian coast, there was at that time thick hazy weather; and heavy dews on the Arabian side opposite.

## THE TIDES AND CURRENTS.

Along the shores of the Red Sea, in some places a rise and fall of the water was observed; and at a few parts of the shore, and in some of the narrowest channels, a tide was seen to flow; but at all other parts it was imperceptible.

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* Thurayyá, or Tsurayyá.

Within the Straits of Bab-el-Mandeb, on both sides of the sea, when the ship at anchor had her head to the N.W., the tide was rising on the shore, when it appeared that the flood ran to the South; but it is to be observed, that the ship was wind rode, the tide stream not being of sufficient force to counteract the effect of the wind upon her hull and rigging; and it should also be noticed, that the abrupt turn of the coast at the entrance of the sea causes an eddy in the neighbourhood of the straits, though not immediately within the small one, as the tide flows into the Red Sea through this narrow channel, at the same time that it is rising by the shore.

On the full and change days of the moon, it is high water at Bab-el-Mandeb at 12 h. 30 m. At Ras Macowa, on the Abyssinian coast nearly opposite to Mocha, the tide, though hardly perceptible, appeared to flow in from the open sea, and it was high water about 12 h. 20 m., and the rise about 2 feet 6 inches. At Amphilla the motion of the tide was not perceptible, but the rise was about 3 feet and the time of high water about 12 h. 40 m. At Ras Mejarmla, on the Arabian coast opposite, the rise was about 4 feet, and the time about 1 h. 10 m. At Camaran Island, the rise at the Equinox was 2 feet 10 inches, and the time of high water 10 h. At Dissee Island, on the Abyssinian coast opposite, a branch of tide flows perceptibly South into Goob Ducnoo; and it runs with considerable rapidity on the eastern side of Dhalac, through the contracted channel, over a rocky bottom, into Doobelloo harbour, and also into Goob-ut-Sogera on the western side of the island Dhalac, through the narrow gut that forms the entrance, where it is high water at 1 o'clock, and, by Captain Court's account, for we were not there on the springs, the rise is 9 feet, and at Dissee Island the rise is $3\frac{1}{2}$ feet, and high water at 1 o'clock. At Massowah the stream of tide was hardly perceptible, but the rise was 3 feet, and high water at 1 h. 0 m. At Loheia, on the Arabian side, nearly opposite Massowah, there was no perceptible motion of tide in the offing, but the rise was three feet, and high water at 1 h. 30 m. in the inner harbour. At Badour, on the Abyssinian coast, the rise of tide was 1 foot 6 inches, and high water at 1 h. 15 m. In Jiddah harbour we observed no motion of tide: there was a rise and fall of water, but so very irregular, that we were unable to obtain correct data. In January and February the greatest rise or fall on the springs was about 2 feet; but in the hot months there is less at low water by 3 feet than in the cold season.

The currents in the Red Sea seem to be entirely governed by the winds: during the prevalence of southerly breezes they run to the North, and with northerly winds to the southward. It is also probable that they increase according to the strength of either, as there was little or none at all during the prevalence of light variable airs previous to the setting in of the South winds.

1829. In November, the current in a strong South, set to the N.W., about 1 mile per hour off Jiddah harbour.

1830. In December, lat. 21° N., on the Arabian side, it set to the North $1\frac{1}{2}$ miles per hour.

1831. In November, off the Outer Reefs on the Arabian side, it set along them N.N.W. 1 mile per hour.

1832. In February, there appeared to be no current in the neighbourhood of Jibel Teer during the light winds. In August of the same year, the current in the south part of the sea set to the South 1 mile per hour.

1832. In the beginning of October, there seemed to be no current; and afterwards, on the north part of the Farsan banks, it was setting to the North about $\frac{1}{3}$ of a mile per hour, amongst the banks and islands on the Outer Reefs. With the exception of those already mentioned, there was an imperceptible irregular flow of tide and current through the several Deep Water Channels, but intermixed so much with eddies from the numerous islands and shallows, that it was quite impossible to ascertain it with any correctness.

## WINDS AND CURRENTS BETWEEN SUEZ AND JIDDAH, BY CAPTAIN MORESBY.

The winds from Suez to Jiddah, during the whole of the year, are mostly northerly, blowing with great violence at times, but generally moderate with the changes of the moon. During the winter months, from December to April, southerly winds at times prevail for a few days, occasionally blowing fresh; more especially in the sea of Suez, where they freshen at times to a moderate gale. In these months, in the sea of Suez, westerly gales are not unfrequent; they are called by the natives the Egyptian winds, and from their violence are much dreaded. On the Arabian coast, near Jiddah, both to the southward and northward of it, northerly, north-east, and easterly winds at times blow with great violence during the winter months, bringing off clouds of dust from the land.

Directions and set of Currents.

The currents in the Red Sea, from Jiddah to Ras Mahommed, are various all the year; no particular direction can be assigned to them; it may be generally remarked, they set with the prevailing winds, which, when strong, cause a current of sometimes twenty and forty miles a day. If the wind continues long in the same quarter, they sometimes set against it, which can be seen by the short deep swell, in a north-west wind, against which the best-sailing vessels make nothing for the first and second days, when all at once they unexpectedly get to windward. Southerly winds, which sometimes prevail from October to May, generally bring a current from twenty to thirty miles a day with them; after a north-wester has been blowing, and light winds prevail, a current generally sets to the northward, more especially on the Arabian coast; on which account the Arabian side, with the northerly winds, is the best to work on, and not the Egyptian coast, which the old navigators preferred, on account of its being more clear of shoals. On the Arabian coast a vessel will be able

to take advantage of the winds, if she is near the reefs and coast, which winds almost always bear several points more from the land as the night advances, and particularly in the early part of the morning, and are well open to seaward during the day: this is not the case on the Egyptian coast, when northerly, north-north-east, and north-east, and easterly winds prevail; at times, from November to March, they cause a strong current to the westward, and as the wind becomes light, it sets back again to the eastward.

The average time a ship takes to reach Cosire from Jiddah depends so much on circumstances, that no definite period can be stated: it is seldom performed in less than ten, or longer than twenty days: in the native boats twenty-five and thirty, sometimes more. A ship ought to have good sails bent on quitting Jiddah for the northward, and if she is proceeding to Cosire, to work up on the Arabian side as far North as NAMAHN ISLAND, in lat. 27° 6′ N., before she attempts to cross the sea to Cosire: for should she make to leeward of the port, it may take her days to work up a small distance.

On quitting Cosire for Suez, with a strong northerly wind, a vessel ought to stand over to the Arabian coast; she will nearly fetch Moilah, in lat. 27° 40′ N., and lon. 35° 36′ E. Having worked up thirty miles to the northward of Moilah, she may then stand over to Ras Mahommed, leaving the Arabian coast at night; as she proceeds along, the northern winds will veer to the N.N.E. out of the sea of Akabah, which enables a vessel to reach Ras Mahommed, keeping a close luff to the islands bounding the head of the sea.

*Passages up and down the Red Sea.*

From what has been said respecting the currents, it will be essential to ascertain the vessel's situation correctly, taking latitude by the stars which pass the meridian, as also correcting the longitude at sunset by sights for the chronometers, of some of the numerous stars at twilight, which, from the clearness of the atmosphere in this sea, are always to be seen. After taking observations at sunset or later, a vessel ought only to stand back to the shore or reefs, half the distance she stands out, and never come nearer than ten miles off the reefs at night, in case of a current. A vessel cannot do wrong by keeping the Arabian side on board, but should not go too close with a light wind or heavy smell, or if there is much probability of the wind failing: in case it blows hard she can take advantage of the anchorages, having a native pilot on board. These men know nothing of the Egyptian coast, which is essentially necessary should a vessel be in distress, or requiring some refit: the native pilots being acquainted with the reefs and anchorages from eye-sight, are always able to take a vessel among them with safety; a stranger, not acquainted with the localities, would feel alarmed in navigating among the reefs; they are all safe to approach, taking the precaution to be on the fore-topsail-yard with the native pilot, and keeping a good look-out for sunken rocks, the eye and not the lead being the only guide. The different shades of green on the coral rocks will show the depth of water and the spot to anchor on; when at anchor, care should be taken of a shift of wind, on the vessel forging a-head, to haul in the slack of the cable, to prevent its taking turns round the rocks, in which case it is with difficulty cleared again.

*Approach to, and nature of the anchorages.*

The hire of a native pilot from Jiddah to Suez is about twenty-five or thirty German crowns, besides their food. If possible, do not take a very old man; they have little inclination to go aloft, and are generally indolent; it is necessary to keep them on the alert, and never place too great a dependence on them; they know nothing when in the midst of the sea and out of sight of land.

## MEMORANDUM OF WINDS AND CURRENTS IN THE RED SEA THROUGHOUT THE YEAR, BY ACTING COMMANDER T. E. ROGERS, OF THE HON. COMPANY'S BRIG OF WAR "EUPHRATES."

From the beginning of October to the end of April, which may be called the winter months, from the straits of Bab-el-Mandeb to Jibbel Teer, in lat. about 15° 30′ N., the wind may be said to blow constantly from the southward, with the exception of an occasional day or two of northerly winds on the full and change of the moon; but two months frequently pass without any change. The current generally takes the direction of the wind 15 or 20 miles per day, particularly that from the northward, from the southerly winds having, as it were, heaped the waters in the upper part of the sea; from this cause also I imagine it is, that a set is at times found against the southerly winds, on the decreasing of a strong breeze from that quarter.

The effect of the southerly wind in raising the water, and the northerly wind in decreasing it, very plainly appears in Jiddah Roads; with the former a small boat can go straight from the anchorage to the shore, whereas with the latter, in the same direction, a succession of dry banks appear, having only a circuitous and shallow channel.

From Jibbel Teer, to latitude 19° or 20°, the winds at the same season are variable, blowing nearly as much from the North as the South, that particular wind predominating as you approach the north or south of the above limits. The currents here, in general, set with the wind, but at times are found to run across the sea as much as 20 miles in 24 hours; occasionally, but not often, a set to windward is experienced of 12 or 15 miles in the same time: the winds here do not, in general, blow so strong as the prevailing ones above and below these limits.

From latitude 21° to 27°, at the same season, the northerly is the prevailing wind, but half a moon seldom passes without having the wind one or two days from the southward, more particularly from the end of November to the beginning of March. The currents here are much the same as between Jibbel Teer and Jiddah;

the southerly wind is less frequent as you approach the north extreme of these limits, strong northerly winds of two or three days' continuance are often experienced here in these months.

From latitude 27° to Suez, the wind is almost constantly from the northward, and, unless during the months of December, January, and February, seldom interrupted by that from the southward. The currents run with the wind, but are not so strong as those experienced more to the southward. The north-western seldom blows with violence here for more than 12 or 15 hours at a time, and, from what I have experienced, I should say it does not blow so strong in the summer as in the winter.

In June, July, August, and September, the northerly winds prevail, with more or less strength, throughout the sea from Suez to Bab-el-Mandeb, with little interruption, occasional slants from the land are met with, particularly in August and September; and a vessel that sails fairly will average 35 miles a day, in working from Mocha to Suez, in these months.

Leaving Mocha in the end of July, 1832, the *Euphrates* worked to Suez in 36 days. In 1836, leaving Mocha in the end of August, she completed the same voyage in 32 days. On both these occasions, from leaving Mocha until she passed the Straits of Jubal, she never had a second reef in the topsails. The water was in general smooth: the current generally against, sometimes with her, the difference giving an average of 3½ and 4 miles daily against her during the voyage.

In opposition to Horsburgh, who says the wind in the sea of Suez generally blows strongest during the day,* I have found in working up on three occasions, once in June, another in July, and again in August, the contrary to be the case, never, on any occasion, having found a second reef in the topsails necessary during the day, whereas at night I have been generally obliged to double reef the topsails, and, at times, take in the mainsail.

Throughout the sea of Suez, a hazy horizon is generally a sign of a breeze, but it is not always its precursor; the same remark applies to a light fleecy cloud hanging above the tops of the Tor or Sinai mountains, as seen from the southern entrance of the Straits of Jubal.

During the winter months, throughout the sea, the northerly wind is generally accompanied by a dry atmosphere, and the southerly wind by one that is damp. A change of wind is thus often indicated some hours before it takes place, or before any other sign is visible.

During the summer months the atmosphere is generally damp throughout the sea, but the sky overhead is so clear that a planet can often be seen at noon-day.

In working up the sea to the Straits of Jubal, I think the Arabian coast is the best to keep on, and in this opinion I am strengthened by the practice of the Turkish ships, which in their way from Jiddah to Cosire, sight the island of Tirahn before they venture to cross over, so much do they dread making the Egyptian coast below Cosire. This is 60 miles further to the northward than I think a fair sailing ship need go, and the practice is sometimes attended with provoking consequences, as I have known one Turk reach Cosire before another who left Jiddah 13 days earlier, in consequence of the former getting a southerly wind below Cosire, which to the other was a foul wind, from his being so far to the northward.

The wind in the Red Sea seldom blows in squalls, but its gradual rise is often very rapid in the northern part.

In the months of December, January, and February, a ship sometimes will carry a fair wind from Mocha to Cosire, and make the passages in 6 or 7 days. I never heard of this being done from Cosire to Mocha, unless in the summer months.

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## SIGNIFICATIONS OF WORDS USED IN THE DIRECTIONS FOR THE RED SEA.

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|---|---|
| Shab, or Shaab (*Sha'b*) ... | A Reef or Shoal. |
| Mirza, or Merza (*Mersá*) ... | An Anchorage. |
| Shurm, Sherim, or Shrum (*Sharm*) ... | A Creek, or Small Cove. |
| Juzeerat, or Jezerat (*Jazírat* or *Jazírah*) ... | An Island. |
| Waddy (*Wádi*) ... | A Valley, or River. |
| Jibbel (*Jebel*) ... | A Hill, or Mountain. |
| Ras (*Rás*) ... | A Cape, or Headland. |
| Guttah (*Kit'ah*) ... | A patch of Rocks. |
| Gurn (*Karn*) ... | A Horn, or Point. |
| Sale (*Seïl*) ... | A Torrent. |
| Gadd (*Kadd*) ... | A Shoal. |
| Khor (*Khaur*) ... | An Inlet. |
| Gubbet (*Ghubbet*) ... | A Gulf. |

* This statement occurs in the directions for entering the sea of Suez, by Capt. Kydd. See p. 374.

# ADDITIONAL REMARKS ON THE RED SEA.

## DIRECTIONS AND DESCRIPTIONS.—WINDS AND CURRENTS.

### DIRECTIONS AND DESCRIPTIONS.

Little Strait.

In entering the Red Sea, the Little Strait is usually frequented, having moderate depths for anchorage. In running for the Strait, when near the entrance, the depth decreases quickly from 30 and 28 to 13 and 10 fathoms; with a fair wind, keep nearly in mid-channel, or rather nearest the island; but there is no danger, although the depths are irregular from 14 to 8 fathoms, coarse sand. At the north part of the strait, a little nearer the main than to the island, lies a small bank, having on it 7 or 6 fathoms, where a few casts may be got in crossing over it, but there is no danger.

Caution in sailing from the Strait towards Mocha.

Having passed through the Strait, and uncertain of reaching Mocha with day-light, with the wind inclining to blow strong from the S.W. or southward, shut in the entrance of the Strait, and anchor to the northward of Cape Bab-el-Mandeb, where the water is smooth; as it may be difficult to bring up, with the Strait open, or farther north towards Mocha. Or, if passing through the Large Strait in the middle or early part of the night, it will be prudent to haul in to the eastward, and heave to until day-light, taking care to keep near the Arabian shore, in soundings from 12 to 24 fathoms: this is preferable to anchoring when blowing strong, as a ship might be liable to lose her anchor. The navigator must be on his guard not to overshoot this port, if he determine to run in the night, for the current sometimes sets strong to the northward, with the southerly winds, from the Straits of Bab-el-Mandeb along the Arabian coast to the northward.

Large Strait.

As there is no anchorage in the Large Strait, except near Bab-el-Mandeb Island, or near the N. Westernmost of the Brothers, contiguous to the Abyssinian shore, the small Strait is generally frequented by ships entering or departing from the Red Sea; but with a steady favourable wind, the Large Strait may be adopted at discretion, for a ship may run through this Strait in the night, when it might be imprudent for a stranger to proceed through the other. In passing through the Large Strait, a ship should borrow well over towards the Island Bab-el-Mandeb, where she may anchor if the wind fail, and prevent being carried over to the Eight Brothers when the current is running to the southward.

Coasts within the Strait.

Having entered the Red Sea by either Strait, steer along the Arabian coast, coming no nearer it than 10 or 11 fathoms, on account of a small bank 8 or 9 leagues to the northward of Cape Bab-el-Mandeb, having 9 fathoms close to its western edge. The Abyssinian coast must be avoided, for in lat. 12° 56′ N., about $3\frac{1}{2}$ leagues from this coast, there is a dangerous shoal, discovered by Captain Court in his survey of this part of the Red Sea, called by him the Panther Shoal, which projects from a small island, the southernmost of a chain of islands fronting the Bay of Asab.*

Panther Shoal.

* In the East India Company's recent chart of the Red Sea, this shoal does not appear to extend more than 5 miles from the islands; nor is the shoal next mentioned, as lying 3 leagues from Ras Firmah, shewn.

Panther Shoal makes the channel between it and the Arabian shore narrower than had been before supposed: to avoid coming suddenly on the edge of this shoal, when stretching over towards the Abyssinian coast, the lead should be kept briskly going, particularly in the night or in hazy weather, and it should not be approached nearer than 19 fathoms.

Another shoal near Ras Firmah. There is another small shoal in lat. 13° 9′ N., about 3 leagues from Ras Firmah (called in Captain Moresby's survey, Ras Loomar), which must be avoided; it is about 4 or 5 miles directly North from the chain of low woody islands, and has from 9 to 17 fathoms water in a channel between it and the islands. Ships may anchor on the north side of these islands in strong southerly winds, or near Crab Island (called Sunnahboar Island), opposite to the bay on the north side of Ras Firmah.

Banks West of it. CORAL BANKS are said to exist to the westward of Jibbel Tor (Jibbel Teer), at 8 and 9 leagues' distance, one of which, bearing W.N.W., 8 leagues from it, a French ship grounded in 1751, and was nearly lost. The Benares, surveying ship, could not find this danger in searching for it; but her boat, in crossing from Dhalac Island to the eastward, discovered a bank extending 12 miles East and West, having only 2½ fathoms water on it; and it is situated in the same latitude as Sabugar Island. The channel generally used is between these dangers and the islands on the Arabian coast, having irregular soundings; deep water towards Jibbel Tor, and shoal coral soundings, on the edge of the banks adjacent to the coast, and near the Aschafas Islands which lie off it. (Proper Channel.)

From Jibbel Tor to the northward. Ships bound up the Red Sea generally take a departure from Jibbel Tor, and afterwards steer up the middle of the sea, endeavouring to keep clear of either coast, particularly the Arabian side, on account of the numerous shoals extending along that side of the channel. When the winds are unfavourable, it may be frequently prudent to see the land, or some of the shoals or islands on either side, before dark, that the navigator may be certain of his situation, and be enabled to work well out in the offing during the night; for in general there are no soundings to warn him on approaching the shoals, most of which are dangerous and steep to.

GULF OF SUEZ. Great care is requisite in working between Shadwan and Toor, particularly in the night or in hazy weather, the channel being narrow and bordered by shoals on the eastern side; islands and shoals also bound its western side, to the distance of 7 leagues from Shadwan, but this is the safe side to work in during the night, as Jubal may be closely approached on its eastern side.

From Shadwan through the Channel. A ship bound up the sea of Suez may pass Shadwan at any convenient distance, but when past this island, she ought not, in working, to stand into the open space between it and Jubal, nor so far over as to approach the dangers on the eastern side of the channel. Having got abreast of Jubal, it will be prudent to make short tacks, keeping nearest to Jubal and its contiguous isles, to avoid the Carrangar Shoals, and Western Shab, on the opposite side, which lie about half-way between these islands and the eastern shore. The breadth of the channel in this part is not above 5 miles, which renders it dangerous to work here in the night.

In passing along, a ship should not stand so far to the westward as to *touch* a transit line joining the east end of Shadwan and the outer part of Zeitee; by keeping a little outside of this imaginary line, all dangers in the west side of the channel will be avoided.

For entering the Sea of Suez, Captain T. Kydd gives the following directions:—

Ras Mahomed cannot be seen farther than 3 or 4 miles, but there is no danger near

it, the water being very deep close to the shore. In crossing over towards the Straits of Jubal, the first danger is the shoal with the Beacon Rock on its south end, which bears West from Ras Mahomed 4 or 5 leagues. If the weather has an unsettled appearance, a ship ought to keep plying betwixt the Beacon Rock Shoal and Ras Mahomed, as the channel in the Narrows is very contracted.

In the day it generally blows strong, but moderate during the night.* If at daylight Mount Sinai is enveloped with clouds, the wind will assuredly blow strong that day; if the mountains be free from clouds, moderate weather will prevail.

When the weather is moderate, a ship should stretch well up towards Jubal, and make several tacks across the channel at the entrance of the Straits before dark, to ascertain the situation of the dangers, if unacquainted.

THE NARROWS, formed between the East and West Shab, might be adopted, with great circumspection, when strong northerly winds and a heavy sea prevent a ship from gaining ground in the large channel to the westward of the Shab, although the latter track should always be followed when the weather will admit.

In the Narrows, the people have the advantage of rest in the night: if it blow too hard to be under way in the day, by remaining at anchor, sails may be repaired if necessary, or any other work may be done. When anchoring in the Narrows, it will be prudent to give the reefs a small berth, to avoid detached pieces of rock which might injure the cables.

Toor Harbour. TOOR, or TOR HARBOUR, opposite to the north part of the high land of Zeitee, in lat. 28° 16′ N., lon. 33° 41′ E., by the late survey, is a safe harbour, formed by a reef that projects from its northern extremity to the southward, having a great surf on it at times. A ship coming from the northward should run close along the reef, until she open the town, and haul round its southern extreme; she may then anchor in any depth at discretion, from 8 or 9 to 5 fathoms. There is a shoal of coral rock to the S.W. of the anchorage, off the entrance of the harbour, which is about 1½ miles long, extending about N.N.W. and S.S.E. This shoal has only from 6 to 10 feet water on it in some places; a ship leaving the harbour may sail to the southward between it and the main, in regular soundings, by steering S. by W. and S.S.W. along the eastern shore. This is the channel generally used when *bound out*, as the winds are northerly three-fourths of the year, and the northern channel is frequented by vessels *bound into* the harbour. When the sun shines, a green shade is reflected from the rocks, by which they may be avoided. The depths in both channels are in general from 7 or 8 to 10 and 11 fathoms, regular soundings. During the violent N.W. winds, ships bound to Suez are often obliged to take shelter in this port, where the water is better than any place in the Red Sea; it is procured from three wells abreast the anchorage, which are about 200 yards from the beach. Provisions, or other articles of refreshment, are not to be obtained. (Good Water.)

The town, which is situated at the N.E. part of the harbour, is inhabited principally by Greeks and Bedouin Arabs. Near the town lie the remains of a well-constructed fort. In 1800, the variation was 12° W. The tide flows to 10½ hours, on full and change of moon, and rises 5 or 6 feet. About 4 or 5 miles to the north-west of the town, Jibbel Mookhtab, or Written Mountain, with other hills near it, stand close to the sea; and the chain of mountains from Ras Mahomed extends to the N.W., parallel to the coast, about 6 leagues inland. (Tides.)

* See note and remarks, p. 371.

## WINDS AND CURRENTS.

At Mocha, and throughout the southern part of the Red Sea, the southerly monsoon predominates about two-thirds of the year, commencing in October or November and ending in May or June; then the northerly winds set in, and continue nearly 4 months. During strong southerly winds, the current frequently sets through the straits with rapidity into the Red Sea. With these winds, the atmosphere is usually red and fraught with vapour; a great haze prevailing, prevents objects from being seen, unless very near. About the full and change of moon, the southerly winds are sometimes checked, and replaced by breezes from the northward, which continue two or three days, and greatly cool the air. The currents at such times are liable to change, and run in opposition to the wind, but in general they set with it in the Red Sea; and also in the straits, or in the gulf outside, they mostly run with the wind.

Winds in the southern part of the Red Sea.

Currents.

In the gulf outside the Red Sea, between the coasts of Arabia and Africa, easterly winds usually prevail from the early part of October to May; then the westerly winds commence and continue about six months. Near the Arabian Coast, the monsoon from westward sometimes begins more early, about the middle of April; the easterly winds setting in on the same coast early in October, with a current running to the westward. Off Ras Jar d'Afoon, between it and Socotra, and in the vicinity of this island, the current begins to set to the northward in April, increasing in strength towards the latter part of the month. As a general rule, it may be observed, that from October to May, or June, the wind is from eastward in the gulf *outside the straits*, and about S.S.E. *inside* in the *southern part* of the Red Sea. During the other six months, it is West *in the gulf outside*, and N.W. *in the Red Sea*, from June to October. This rule is not applicable to the *northern part* of the sea, for the northerly winds prevail there during nine months of the year, particularly in the sea of Suez, and frequently blow strong; at all times in this sea southerly breezes are of short continuance. The strong N. Westers that prevail in the sea of Suez seldom blow to the southward of the Brothers. And the strong southerly winds which prevail at Mocha seldom reach above lat. 15° or 16° N., for about Juddah, and half-way up the Red Sea, the winds are often light and variable. It is almost impossible to beat up against the northerly winds to Suez in June, July, and August. Ships bound to that port should endeavour to reach it before the 1st of May, or more early if possible; and although, when bound outward, they may get down the sea of Suez at any season, it is prudent, if bound to a distant port, that they depart from Suez by the 25th or 30th of August, to enable them to clear the Straits of Bab-el-Mandeb in September, before the easterly winds commence in the gulf outside. Ships leaving the Straits after the 10th of August, should keep near the Arabian coast, to avoid the strong current, which then begins to set to the S.W. and Westward, at the rate of 2 or 3 miles an hour, along the African shore, from Cape Felix to Zeyla; but when near the meridian of Ras Jar d'Afoon, the open sea is the best track to make easting, keeping well out from the Arabian shore.

Winds outside.

General remark.

Winds in the northern part of the Red Sea.

Periods for arriving at, and departing from Suez.

Leaving the Straits.

# PASSAGES TO AND FROM THE RED SEA.

To approach the Red Sea in Nov. and Dec.

If bound to the RED SEA from BOMBAY, or any other port on the northern part of the Malabar coast, in November and December, a ship should steer a direct course, to pass between the island Socotra and the Arabian coast; and afterwards to the westward, to fall in with that coast about Aden; taking care to keep a good look-out, and attend to the lead when requisite. In these months, the monsoon blows strong, particularly to the westward of Socotra; the weather is also frequently dark and cloudy, unfavourable for making that island, nor is it necessary at this season. A speedy passage may be expected to the Straits. In January and February, a ship performing this passage will experience nearly the same winds, but more moderate, with fair weather; she may, therefore, make the N.E. end of Socotra, if thought expedient, and then steer along the north side of the island, shaping a course from its west end direct for Aden; or she may, as before, steer to the northward of the island without seeing it, direct for the coast of Arabia near Aden.

In Jan. and Feb.

In March and April.

In March and April, the winds are less constant than in the four preceding months, often veering between N.N.W. and N.N.E. in alternate brisk and light breezes, with calms at times, and settled pleasant weather. In these months, a ship should steer a course from Bombay to pass to the southward of Socotra, for early in April the N. E. monsoon is nearly expended about this island, and also on the coast of Arabia, which is succeeded by light breezes from S. W. and Westward, with frequent calms. The current also begins to set strong to the northward about Socotra, and between it and Ras Jar d'Afoon; it is therefore prudent about the latter part of March, or early in April, to pass on the south side of that island, at the distance of 12 leagues, to be enabled to reach Ras Jar d'Afoon with the S. Westerly winds, which may then be expected.

Some ships which left Surat late in March, made the east end of Socotra in the middle of April; one of them kept working in sight of that island 14 days, with S. Westerly winds and calms, and was in danger of losing her passage, the current being constantly against her. The other ship stood with W.S.W. and S.W. winds, to the southward of lat. 3° N., got the wind favourable, and had from thence a quick passage.

Passages of the Latham and Gunjavar.

The Latham sailed from Surat April 8th, 1758, and arrived at Mocha 12th of May. She went as far south as lat. 10° N., had light variable winds, mostly from N.E. and S.E., and strong currents, setting northward, on approaching Ras Jar d'Afoon; she made the land in lat. 11° 12′ N., and had that day 34 miles of northerly current in running along the coast of Africa. The Gunjavar of Surat left that place the day after the Latham, saw Socotra, and fell in with the Latham off Cape St. Peter. Although the Gunjavar sailed well in light winds, it was imprudent to make Socotra so late in the season, for the passage might have been endangered thereby.

If a ship sail from Bombay or Surat in April, she ought certainly to steer to the S. Westward, to be able to pass well to the southward of Socotra; for if not able to weather that island with the S.W. winds, it is probable that, to save the passage, she

will be obliged to stand to the southward nearly to the equator, before she can be certain of reaching the coast of Africa on the other tack. If late in April a ship depart from Bombay, a course more southerly will be requisite, to enable her to fall in with the coast of Africa to the southward of Ras Jar d'Afoon; for at this late period she will probably meet with the S. Westerly winds long before that coast is approached. The coast may be made anywhere between Ras Hafoon and Ras Jar d'Afoon, but the deep bay to the S.W. of the former cape should be avoided, as the danger is great, if a ship get into this bay with strong S.E. winds, or in the night; which has been before noticed, in describing the coast of Africa from the equator to Ras Jar d'Afoon. Where to make the land.

Having seen the land, it will be prudent to pass close round Ras Jar d'Afoon; if April be far advanced, keep along the coast to Ais Island, and then steer over for Cape Aden. If more early in the season and abreast of Ras Jar d'Afoon with a steady fair wind, a direct course may be steered for the coast of Arabia about Cape Aden. In May, June, July, and August, when the S.W. and W.S.W. winds blow strong, it may sometimes be tedious beating along the coast of Africa, from Ras Jar d'Afoon to Burnt Island, but it is proper to persevere, by working near the coast until up with the island just mentioned, and then cross over for Aden. A ship that sails well may work up from Aden to the Straits of Bab-el-mandeb, during the strength of the westerly monsoon, if every advantage is taken; particularly on the springs, when the current is liable to change and set to the westward; the wind at such times is also subject to small changes, or in these months a quicker passage may sometimes be made, by keeping near the African coast till about 20 leagues west of Ais Island, then cross over for the Straits of Bab-el-mandeb, or as near to them as the wind will admit. Directions when late in the season.

The season for the passage from Bombay to the Red Sea is from October to April, but the best time to sail is from the 1st of February to the middle of March; ships which sail from the former port after April must proceed by the southern passage, and run down the westing in south latitude. They will have strong southerly winds on the east coast of Africa about Ras Hafoon, if they make the land there during the S.W. monsoon. In beating from Ras Jar d'Afoon to Ais Island, ships should have good sails bent in June, July, and August, for the wind frequently blows in severe gusts.* In May it is more moderate, and generally blows farther from the southward, making the progress to the westward along the African coast less difficult than in the subsequent months. Ships may also cross over for Aden with greater confidence in May than at a later period. Season for sailing from Bombay to the Red Sea.

SHIPS bound to the RED SEA, from ANJENGA, COCHIN, CALICUT, or other ports on the southern part of the Malabar coast, may steer directly to the westward through the most convenient channel among the Laccadiva Islands, in November, December, January, and February. Those which sail from Cochin or Anjenga ought to pass to the southward of Seuheli-par, keeping in about lat. 9° 20′ or 9° 30′ N.; but ships departing from Cannanore or Mangalore should pass to the northward of all the islands. In March and April, as the prevailing winds between the coasts of Malabar and Africa are from North to N.W., it is proper to keep near the land until to the northward of Mount Dilly, and pass to the northward of the islands and shoals: otherwise, ships sailing from Cochin, or Anjenga, ought to pass near to the Islands Kalpeni and Seuheli-par, if the Nine-Degrees-Channel is adopted, as the current generally sets to the southward in these months, toward the Maldivas. From southern ports of Malabar, towards the Red Sea.

* Some ships, in these months, have returned to Bombay, thinking it impracticable to beat up to the Straits of Bab-el-mandeb; but it may be effected by a good sailing ship at all seasons, if she is well fitted with sails and other requisites.

When clear of the islands, in November, December, and January, a direct course may be steered to pass Socotra on the north side. In February, a ship may steer to the westward in about lat. 11° or $11\frac{1}{2}$° N.; but late in March, or early in April, it is prudent to keep farther to the southward, in lat. 9° or 10° N., as the winds admit. In April, they generally prevail between North and N.W.; a ship must then keep close to the wind, making a short tack to the northward at times, to prevent running too much to the S.W.; but these trips should seldom be made, as getting to the westward is most essential. During this month, there can be no reason for proceeding to the southward near the equator; but in May, when the S.W. monsoon may be daily expected, it is prudent to keep well to the southward.

Late in April, or early in May, when a ship has approached within 2° or 3° of the African coast, she will generally meet with S. Westerly winds, which draw more to the southward near the shore; she must endeavour to make the coast to the south of Ras Jar d'Afoon at this period, for by falling to leeward of Socotra, the passage would become uncertain; to save which, she might be obliged to stand on a wind to the southward and cross the equator before sufficient westing could be obtained.

From eastern parts of India towards the Red Sea.

Ships bound to the RED SEA, from the EASTERN PARTS of INDIA, should before April, pass round the south side of the Island of Ceylon, then steer along the west part of that island to Caliture; a direct course may then be followed to pass through the Nine-Degrees-Channel, as already described for ships sailing from Cochin or Anjenga.

In April, westerly winds being prevalent off the S.W. part of Ceylon, it is often difficult and tedious getting round it; these westerly winds are also adverse in proceeding from that island to the Nine-Degrees-Channel; ships, therefore, bound from the southern part of the Bay of Bengal, after March, ought to adopt the southern passage, when bound to the Red Sea. They should run into lat. 9° or 10° S., to the southward of Diego Garcia, where the winds will be found more favourable in the early part of the season for getting to the westward, than in the other, or *short southern route*, between the south end of the Maldivas and the Speaker Bank.

From the Red Sea in the easterly monsoon.

DEPARTING FROM THE RED SEA, the egress is often very difficult, and seldom attempted from September to April, when the easterly monsoon blows into the gulf outside the Straits of Bab-el-mandeb. If a ship be able to beat out of the gulf, the same N. Easterly monsoon continues to be adverse, if she is bound to any part of India, or to the Persian Gulf.

Between Morebat and Ras-el-had, the S.W. monsoon also blows strong, but here, it draws more to the southward, in conformity to the direction of the coast. In September, the winds from eastward commence, and continue till the end of March, with frequent land and sea-breezes; the land-breezes from the westward are faint, but the sea-breezes are strong from the eastward; and this is the fair monsoon, the weather being settled in general. The current frequently runs to the westward along the coast in this season; it is however liable to change at times, and set to windward. A ship that sails well close hauled may make a passage to the eastward along this coast during the easterly monsoon, although a speedy passage ought not to be expected in this season. Admiral Blankett's squadron worked along the coast of Arabia, against the N.E. monsoon, and were two months on the passage from the Red Sea to Bombay.

Easterly monsoon.

Current.

Passages against the easterly monsoon.

A fleet of ships of war, and store ships, left Johanna 25th September, 1781, and crossed the equator on the 5th of October, in lon. 48° E., which was too far to the

westward. After getting into lat. 8° 20′ N. about lon. 55° E., they had during five weeks light airs and calms, stood to the northward and made the coast of Arabia, near the islands off Curia Muria Bay.

The ships of war left the convoy, and proceeded to Bombay against the monsoon; Captain Smith, in the San Carlos, left in charge of the store ships, carried them to Morebat, where they anchored, and procured refreshments and indifferent water.

From this place, the convoy of indifferent sailing ships worked along the coast against the monsoon to the Island Mazeira, and meeting there with a southerly wind, steered direct for Bombay.

These statements evince that a passage may be made against the N. E. monsoon, on the coast of Arabia; but it should be avoided if possible, for it must be always unpleasant and tedious.

Although on this coast, the currents generally set with the wind during the easterly monsoon, they frequently change, and run against it, three or four days, about the full and change of moon. This is favourable for ships working to windward near the shore, which may be approached close in this season, as the winds seldom blow strong toward it, during the easterly monsoon. Currents.

H. M. Squadron* under Rear-Admiral Blankett, bound to Bombay, worked through the Small Strait, 16th October, 1799. On the 19th, they passed Aden with easterly winds. From hence, they worked along the Arabian coast with the same winds, the weather generally clear, and the current frequently setting against them to the westward. November 20th, they reached Cape Morebat, and were off Ras-el-had 1st December. From the latter cape, they steered for Muscat to get a supply of provisions and water; but a strong N.W. wind commencing when near it, obliged them to bear away for Bombay, where they arrived on the 15th, after a passage of two months. Notwithstanding the tedious passage these ships experienced, they had often land and sea-breezes on the Arabian coast, and a current sometimes in their favour. They spoke a dow off Cape Morebat, which by standing out in the open sea got better winds, and reached Bombay 15 days before them.

In April, when Westerly and S. Westerly breezes commence on the southern coast of Arabia, ships may with safety leave the Red Sea, and proceed for the Persian Gulf, or the coasts of India: the favourable season to depart from it is from April to September. Ships bound to Surat do not leave Mocha till the early part of September, that they may arrive with the latter end of the westerly monsoon in Surat Road, about the 20th of that month; for it would be dangerous to run for this anchorage when the monsoon is in full force. When clear of the Straits of Bab-el-mandeb, a ship should steer to the eastward in the middle of the gulf, where the wind is more steady than in the vicinity of either shore; but if the wind is light or baffling, she must beware of getting near the African coast, on account of calms and strong westerly currents, mentioned before. When to depart from the Red Sea.

Ships bound to Ceylon, or other parts more to the eastward, should steer a course to pass through the Eight-Degrees or Nine-Degrees-Channel, between the Laccadiva and Maldiva Islands. This route may be followed from March to November, and it is preferable to any other during this period, and may be chosen even in the strength of the N. E. monsoon, if a ship keep near Seuheli-par, in passing through the Nine-Degrees-Channel: but from October to April, it is more advisable to pass to the northward of the Laccadiva Islands, and afterwards proceed to the southward, along the Malabar coast to Cape Comorin, and from hence steer for Point de Galle.

* Leopard, Centurion, Dædalus; and the Bombay Frigate.

# COAST OF ARABIA, FROM THE ENTRANCE OF THE RED SEA TO MISENAAT, IN LON. 50° 43′ E.

FROM THE SURVEY AND DIRECTIONS OF CAPTAIN S. B. HAINES, OF THE INDIAN NAVY.

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Cape Bab-el-Mandeb.

CAPE BAB-EL-MANDEB, on the north-eastern side of the entrance to the Red Sea, is a prominent headland, with low land behind it, giving it, when first seen from the offing, the appearance of an island. It has numerous rocky points forming small bays, some of which afford shelter for small vessels, and in which the boats from the opposite side land sheep for the Mocha market. Quoin Hill (Jibbel Men Ali), which forms the high land of the cape, slopes towards the sea, and is about 865 feet high ; rendering it generally visible from a ship's deck, at the distance of 35 miles, always having the appearance of a quoin. The rock composing this mountain was found by Captain Haines to be highly magnetic, causing his theodolite needle to vary 13° from the magnetic meridian.

Inland mountains.

Inland to the N. Eastward, about 15 miles, is a range of hills, called Jibbel Hedjaff, and immediately beyond them the longer range of Jibbel Arrar, known by the name of the Chimney Peaks, from their irregular and peaked outline. These ranges run in a N.W. and S. E. direction, and are fronted towards the sea by low land. This low land not being discernible at a great distance, causes the inland mountains to be sometimes mistaken for Cape Bab-el-Mandeb. The S. Eastern end of this Arrar range terminates in a barn-like mountain, with a peak in its centre, called Barn Peak.

Heyhjba Bay.

Between Ras Bab-el-Mandeb and Ras Arrar, which is 9 leagues farther East, is a large bay, called by Captain Haines the Bay of Heyhjha, with low and sandy shores. The depths in the outer part of the bay are from 14 to 20 fathoms, decreasing towards the shore.

A ship standing into this bay should not shoal her water to less than 10 fathoms by day, or 14 by night, in order to avoid the 3 and 3½ fathom knolls which are outside the reef, distant about a mile from the shore. Ships working into the straits during the strong north-westers of June and July will find convenient shelter in this bay, under the east side of Cape Bab-el-Mandeb; for although gusts may come off the land, the water will remain smooth. The bank of soundings extends about 12 or 14 wide off this part of the coast. Water may be obtained here, from a well 2 miles to the eastward of the Sekeya date trees, which stand near the shore 6 miles E. N. E. of the eastern point of Cape Bab-el-Mandeb. Firewood was found by Captain Haines in large quantities strewed along the beach.

Ras Arrar.

RAS ARRAR, in lat. 12° 35′ N., lon. 44° 1′ E., is about 26 miles to the eastward of Cape Bab-el-Mandeb. It is very low and sandy, and much rounded, having no distinct point. There is a shoal bank running off the shore to the eastward, which being in the direct route of vessels proceeding to and from the Red Sea, renders this one of the most dangerous capes on the coast; several vessels have been wrecked near it.

There is safe anchorage, with easterly winds, to the westward of the cape, in from 6 to 12 fathoms. The coast to the eastward of Ras Arrar continues low and sandy to Khore Amerra, 13 miles distant, and is fronted by the bank already mentioned, which extends 3 and $3\frac{1}{2}$ miles off shore, suddenly shoaling on its outer edge from 15 fathoms, and having many dangerous knolls.

KHORE AMERRA is a basin-like inlet, of 3 or 4 miles in extent, having a depth inside from 3 to 6 fathoms; but its entrance, which is on its west side, is both shallow and intricate. This basin is formed to seaward by a narrow strip of land continued from its eastern side, and so low as to be nearly covered at low water spring tides. Immediately behind Khore Amerra, to the northward, is the high land of St. Anthony (Jibbel Kurruz), rising to an elevation of more than 2,700 feet. Seven or eight miles farther to the eastward, the saddle hill, called Jibbel Ghow, rises to 798 feet, with several small hills near it; and about 3 miles S.S.E., the black hill forming Ras Ghow. The coast between Khore Amerra and Ras Ghow, like the coast before described, is fronted by a sand bank, extending in some parts about 4 miles off the shore; and although the limits of the bank may sometimes be seen from a ship's mast-head, much caution is always necessary in approaching this part of the coast, as the water shoals very suddenly. Ras Ghow is in lat. 13° 40′ N., lon. 44° 33′ E. Khore Amerra. Coast between Khore Amerra and Ras Ghow.

The coast from Ras Ghow to Ras Amaran forms AMARAN BAY (Bunder Amaran), and is low and sandy, interspersed with a few bushy shrubs, which is the character of the country for many miles inland. The soundings in this bay are tolerably regular, with a depth of 12 and 13 fathoms 2 or 3 miles off the shore. The bottom is principally clay and sand, but in some parts clay and shells with occasional rocky patches. There is excellent shelter in this bay from the Easterly winds under Ras Amaran, which cape forms the eastern termination of the Subiee territory. Captain Haines, who had considerable intercourse with the inhabitants of this district, speaks of them as being of a naturally kind and friendly disposition, but that the cruel and treacherous treatment they receive from their hostile neighbours has made them suspicious and revengeful. They profess the Mahomedan religion, and are governed by two principal chiefs or sultans, who exercise an unlimited authority. Amaran Bay. Character of the Subiee tribe.

RAS AMARAN, in lat. 12° 44′ N., lon. 44° 50′ E., is a small rocky island fronted on its west side by rocks, and separated from the peninsula of the main land by a narrow rocky channel. The land forming the peninsula, as well as the island, is hilly, rising to a considerable elevation, and there are two coves formed by rocky peninsular points on its eastern side; the easternmost of these points is the peak called Jezerat Aboo Summa. In shore of the low sandy isthmus there are a few fishermen's huts and the tomb of Sheik Summaru. The bay between Ras Amaran and Jibbel Hassan, is called BUNDER FUGGUM, and contains a small island (Jezerat el Juhub), nearly mid-way between its extreme points, Ras Amaran and Ras Fuggum. There is also a rock, generally above water, about a quarter of a mile E.S.E. of that island, with a 5 fathoms channel between them. The soundings in the bay are regular, and vary from 3 to 7 or 8 fathoms, with sandy and muddy bottom. The land is a low swampy tract of sand hills, giving at high water each of the high capes the appearance of an island. Ras Amaran. Bunder Fuggum.

JIBBEL HASSAN is a mountainous peninsula, separating the bays Bunder Fuggum and Aden Bay. The highest mountain of the peninsula, which is near the centre, has an Jibbel Hassan.

elevation of 1,237 feet, and there is a doubled-peaked hill, known by the name of Asses' Ears, near its eastern bluff point. The mountains of this peninsula form into 6 principal projecting points, the southernmost of which, Ras Majellub Haidee, is in lat. 12° 43′ N., lon. 44° 59′ E. On the south-eastern side of this peninsula there are 9 rocky islets, nearly joining the main land at low spring tides. One is in the small bay (Bunder Sheik) to the eastward of Ras Majellub Haidee; two more in the entrance of the next bay, Khore Ghadier; another off the N.E. point (Ras Sulliel) of this bay, and five off the eastern bluff of the peninsula within a mile of the land. On the western side of Khore Ghadier, there is a white tomb, near which the Hagrabees deposit coffee, cotton, and a few other articles of merchandize, for the small trading boats which resort to Bunder Sheik and Khore Ghadier, the only ports belonging to the Hagrabee tribe. There is a narrow inlet, called Khore Bier Hamed, or Seyla, round the eastern bluff, running 2 or 3 miles in a W.N.W. direction, at the foot of the northern mountain of the peninsula, which, with the flatness of the isthmus and the inland country, give Jibbel Hassan, when at a distance, the appearance of an island.

The village of Bier Hamed stands on the sandy plain about 5 miles N. by E. of the inlet just described, and about 3 miles from the shore of Aden Bay. It has a fort, and is the residence of Hamed Ben Maidee, the Sheik of the Hagrabee tribe, who, notwithstanding the limited extent of his territory, which, according to Captain Haines, does not exceed 20 square miles, has generally contrived by his vigour and warlike activity to maintain his independence. This chief appears to be remarkable for his disregard of justice, and for his treacherous violation of his own engagements. He gave a kind reception to Captain Haines and his officers, although his people, until subdued by fear, manifested a very hostile disposition towards the party on landing.

*Character of the Hagrabee chief.*

*Aden Bay.*

ADEN BAY (called BUNDER TOOWYEE by the natives), is formed between the peninsula of Jibbel Hassan and Jibbel Shumsan, the former of which has been already described.

This bay is about 3 miles wide at its entrance, and expands to 8 miles, if the inner basin or harbour of Aden be included. Its general depth is 3 and 4 fathoms, shoaling gradually to the beach; across the entrance 4½ to 5 fathoms will be everywhere found, and 10 fathoms at 2 miles off the shores of the two peninsulas, with sand and mud inside and outside the bay.

*Anchorage. Tides.*

Some caution is necessary in anchoring on the eastern side of the bay, off Alliea, where the water shoals rather suddenly. There are several rocky islets within the inner basin, and outside of it the Flint Rock stands about 2 cables' lengths from the peninsula, with an inside channel of 12 feet. Captain Haines recommends a position near this rock as good anchorage, although with westerly winds the western side of the bay necessarily affords the most shelter. The tides are strong and irregular, being influenced by the currents outside. High water at full and change, between the hours of 9 and 10, rise about 8½ feet.

*Aden Harbour.*

ADEN HARBOUR,* or inner basin, already mentioned, is at high water between 3 and 4 miles long, from North to South, and 2 miles broad; but the sand banks on its northern and eastern shores, which dry at low water spring tides, contract the harbour to about two-thirds of the above dimensions. The entrance, which is on its western side, is at low water about a third of a mile across, from the sand spit of Alliea on the

* This description is taken principally from the chart.

north, to Hedjoff Point on the south. There is a rock close off this point, which must be avoided ; it is marked in the chart as a sunken rock.

There are from 10 to 15 feet water in the entrance, and this depth is continued over the central part of the harbour. The islands in the harbour are the following: Alliea and Jum Allier, on the sand spit, north of the entrance: Mirzuk Kebir, 3 quarters of a mile within the entrance and opposite to it; three smaller islets, between Mirzuk Kebir and the shore to the S.E., and half a mile East of Mirzuk Kebir; the larger island of Jezerat Swayea, which is 300 feet high, and at low water joins the sandy isthmus to the eastward.

Cape Aden is a high rocky peninsular promontory, the most elevated part of which bears the name of Jibbel Shumsan, and the highest of its turreted peaks is about 1,776 feet above the sea, and visible 60 miles in clear weather. *Jibbel Shumsan, or Aden Peninsula.*

This peninsula has many projecting points, the southernmost of which, Ras Sincilla, or Cape Aden, is in lat. 12° 45′ N., lon. 45° 9′ E. On the eastern shore of the peninsula, in lat. 12° 47′ N., lon. 46° 10′ E., stands the town of Aden; to the southward and S. Eastward of which are two small bays, called respectively, Bundar Duras and Bunder Hokat, separated by the narrow projecting point, called Ras Marshig. On the north side of Bunder Hokat, and fronting the town of Aden, is the fortified island of Seerah. It is a triangular rock, about 430 feet high, and 3 quarters of a mile in circumference. The small haven, which formerly existed between this island and shore, is now filled up with sand, and the island itself is at low water united to the main. The anchorage in Aden Road has regular soundings, and although during easterly winds a heavy swell rolls in, good anchorage and smooth water may always be found in June, July, and August, during the westerly winds under the lee of Seerah. The hot, dry gusts from the hills are usually strong and very disagreeable. *Cape Aden.* *Seerah Island.* *Anchorage.*

The narrow isthmus of Aden is low and sandy, and the coast, of a similar character, takes a N.N.E. direction for 16 miles, when it bends gradually to E. by S., and continues in that direction for 12 miles to Ras Saylan, forming the bay of that name. Captain Haines recommends ships to avoid this bay, from the difficulty they might experience in getting out of it when blowing fresh from the eastward. A ship was wrecked here in 1836, and several Buggalows narrowly escaped. *Saylan Bay.*

RAS SAYLAN, in lat. 13° 4′ N., lon. 45° 29′ E., is a low, round, sandy beach, having on it a few date and larger trees inland to the northward and westward. The bank of soundings extends from the cape about 10 miles, shoaling from 100 to 40 fathoms, with 12 fathoms at 2½ miles' distance, gradually decreasing towards the shore. *Ras Saylan.*

From Ras Saylan the coast runs in a N.E. ½ N. direction 22 miles to the Saddle Hill, called Kermin Classie, and then bends more to the eastward to Shugra 4 miles farther East. The shore here is lined by a reef, and about 2 miless off shore, bearing S. by W. and S. by E. from Kermin Classie Hill, are the Barrow Rocks, which are two rocky reefs, the northern one having 2 fathoms water on it and the southern 1 fathom. A ship, in standing in towards this part of the coast, should not shoal her water under 15 fathoms, nor bring Kermin Classie Hill to the eastward of North. There is a good channel between these reefs and the shore, having from 4 to 8 fathoms water. Mid-way between Ras Saylan and Kermin Classie Hill, inland, stands the town of Assallee and the village of Elkhore. *Barrow Rocks.* *Caution in approaching the coast.* *Assallee Town and Elkhore Village.*

SHUGRA, the principal sea-port of the Fouthelee Province, is a small village, and the occasional residence of the Sultan. It has a castle, and its small harbour is formed *Shugra.*

by a break in the reef which lines the shore; its depths are from 1 to 3 fathoms, and is capable of containing twenty moderately-sized boats. The mark given by Captain Haines for entering, is Shugra Castle on with a hill shaped like a barn, with a peak on its west end, about 6 miles inland, which is also a good leading mark for taking an anchoring berth off the town. He anchored the Palinurus in 9 fathoms, 300 fathoms outside the reefs.

Tides.

The Castle is in lat. 13° 21½′ N., lon. 45° 45′ E. High water at 7 o'clock on full and change; rise of tide 8 or 9 feet, the flood setting to the westward. This place is well supplied with good water; bullocks, sheep, poultry, onions, and pumpkins may also be purchased.

Coast between Shugra and Zeghir Mugatayn.

The coast line between Shugra and Zeghir Mugatayn, which is about 40 miles farther East, is irregular, jutting out into small points, the land near the sea being very flat, except in approaching Jibbel Harrase, about 13 miles to the eastward of Shugra, where the high land approaches the shore. At this point also terminates the bank of soundings, 20 or 30 fathoms being here at the same distance from the shore as 6 or 7 between it and Aden.

Mountains.

The range of mountains called by the Arab navigators Jibbel Fouthelee, and by the natives Jibbel Harrase, extends 20 miles parallel with the shore, the highest part of the range being 5,442 feet. The summit of this range is singularly formed into gables, peaks, and bluff points. The most conspicuous gable mountain is 3,900 feet above the sea, and has an opening in it like an immense embrazure, giving it from the eastward the appearance of a double peak, and suddenly falling with an almost perpendicular descent towards the sea. The valleys are thickly covered with vegetation.

Zeghir Mugatayn is merely a small boat anchorage, formed by the projecting rocks of the coast; the bottom is shoal and rocky.

Mugatayn.

MUGATAYN, which is 5 miles East of the little boat harbour just mentioned, is the anchorage to which the trading vessels resort for shelter during the N. E. monsoon. The sandy point, which has a black ruin on it, is in lat. 13° 25′ N., lon. 46° 31′ E., having several low rocky islets and sunken rocks extending a quarter of a mile in a southerly direction, and two shoal patches, one a quarter of a mile S.S.W., and the other nearly half a mile East of the outer islet, with channels of 4 and 5 fathoms inside of them. The islets being much frequented by birds, are perfectly white.

Anchorage.

It is on the west side of these islets that vessels anchor in depths according to their draft. The bottom is generally sandy, but has a few rocky patches.

From Mugatayn to Howah, a distance of 15 miles, the coast is flat and sandy, with 10 and 12 fathoms about 1 or 1½ miles off the shore, which is free from danger.

Howah.

HOWAH is a small village 5 miles inland, but, by the chart, there appears also a village near the sea, called Howtha; the point on which it stands is called Ras Ourlgah by Captain Haines. Howah is the chief village of the Ourlgee tribe and the residence of the Sultan, by whom Captain Haines and his officers were received with great hospitality. It was at this place that the crew of the ship Nathaniel were treacherously murdered on the 4th September, 1715. The natives, it appears, were at first friendly, and offered to supply the ship with water, bullocks, and sheep; but the people, on landing, were enticed from the shore into a tent, where twelve of them were massacred. Captain Haines mentioned this transaction to the chief, and was assured that his ancestors were not in any way implicated in it; they, the Ourlgees, had obtained

The natives and their chief.

possession of the place by conquest from the Ben Zaads about the year 1775. "He seemed," says Captain Haines, "perfectly informed on the subject, and recurred to the date of this unhappy affair in order to relieve my mind from any distrust in the general character of his people." Although the government is despotic, the chief, who is an independent sovereign, is highly esteemed by his subjects. Bullocks, fish, and an abundant supply of good water may be procured. Supplies.

The soundings along the coast to the eastward continue pretty regular, the depths at 5 or 6 miles off shore being about 160, and within $1\frac{1}{2}$ or 2 miles, about 20 fathoms.

The coast from Ras Ourlgah is nearly straight to the village of Sheik Abderaman Baddas, a distance of 40 miles, and about mid-way is the conspicuous white tomb of Sheika Hourba, 7 miles to the eastward of which is the limit of the Ourlgee territory.

Sheik Abderaman Baddas has a mosque, near which are the few fishermen's huts that form the village. It is exceedingly poor and miserable, and at the time of Captain Haines' visit could only boast of one small boat for the whole party. He was informed that there was a 40 fathoms bank off this part of the coast, and another nearly South of Ras Hammaree, but he did not find them. Sheik Abderaman Baddas.

The coast, after passing Ras Abderaman Baddas, runs in a N.E. direction to Ras Suffwan, 15 miles distant. This is a slightly projecting point, thickly covered with bushes, in lat. 13° 48′ N., lon. 47° 42′ E.; and North of it will be seen a conspicuous peak of the Hammaree mountains. Ras Suffwan.

HOWRA is a village lying on the N.E. side of Rass Suffwan, and 4 miles farther is Muckanate Bluff, which is described as a "whitish-looking point, veined by dark strata;" it has a rock close off it, and a bight is formed between the two capes. Howra.

The Hammaree range of mountains, commencing on the shore near Howra, has a peak about 14 miles inland, rising to the elevation of 5,284 feet above the sea, which, either from the S.E. or S.W., resembles the roof of a barn, and cannot be mistaken by ships approaching the land on these bearings. Mountains.

Ras Gosseyn or Hammaree is a rounded cape, 8 miles East of Muckenate Bluff, with two very large trees on it; and E. $\frac{1}{2}$ N., 21 miles from Ras Gosseyn, is Ras L'Asseedah, a prominent cape, having on its extremity a rocky conical hill, 160 feet high, which is readily discernible at the distance of 5 or 6 miles. Ras Gosseyn.

A deep bay is formed between Ras Gosseyn and Ras L'Asseedah, with depths of water varying from 155 to 5 and 6 fathoms, fine sand and shells or stones, the deeper part being towards its eastern side between 3 and 4 miles from the shore. The village of Aynbah Marbaut stands on the sand-downs 2 or 3 miles inland of the centre of the bay; there is an excellent spring of water in its neighbourhood. Between this place and Ras L'Asseedah there are two other villages, called Ayn Jowanee and Gillah, the former half a mile inland, and the latter a fishing village about 3 miles N.W. of Bel'aaf.

BEL'AAF is a little bay on the west side of Ras L'Asseedah, and is a good anchorage in easterly winds. The bottom will be found entirely free from rock, unless a vessel should incautiously run too far to the N.N.W., where, between 1 and 3 miles from the cape, a shoal bank of rocks and sand extends half a mile from the shore. Bel'aaf.

In entering with a strong easterly breeze, the point should be rounded at the distance of 300 or 400 yards, having taken the precaution of reducing the vessel to snug sail in order to meet the sudden gusts which may be experienced immediately after

rounding the cape. When round the point, keep Black Barn Hill about a point on the starboard bow in running for the anchorage. This hill is near the shore, and bears North nearly 2 miles from the western extreme point of the cape. The bank of soundings in this anchorage is steep; Captain Haines anchored the Palinurus within 350 yards of the southern rocky point of the bay in 15 fathoms, and after veering away 60 fathoms of chain had 23 fathoms at his gangway. At the head of the bay stands a rudely constructed square tower, garrisoned by one or two soldiers.

Ras Ruttle. Between Ras L'Asseedah and Hussan Ghorab, a distance of 8 miles, the coast is irregular, with jutting rocky points and small intervening bays, and mid-way is the remarkable volcanic promontory of Ras Ruttle, a round and considerably elevated cape with a crater in its summit.

Hussan Ghorab. HUSSAN GHORAB is a rocky cape, 456 feet in height, with steep sides, having off it to the southward the island of Hellannee, separated from the cape by a narrow and shoal channel. The island is 3 quarters of a mile in length North and South, and half a mile in breadth.

Hussan Ghorab is the site of the ancient Canna, Canaan, formerly one of the most important places on the Arabian coast. Many interesting ruins of the ancient city remain, which were examined by Dr. Hutton and his party.

Bunder Hussan Ghorab. BUNDER HUSSAN GHORAB is a secure and well-sheltered bay to the eastward of the cape, which forms its S.W. point. It is 1½ miles wide, but a rocky reef extending from the eastern shore reduces the width of the entrance-channel to 3 quarters of a mile.

Approaching from the S.E. a vessel should not near the eastern point of the bay under a depth of 12 fathoms, and on passing Hellannee Island in 8 and 9 fathoms may stand right in for a square tower or house, which will be perceived at Bier Ali on the N.E. shore of the bay, keeping it between N.N.E. and N.E. by N., and anchoring in 4 fathoms about a quarter of a mile off shore. Care should be taken not to bring the square house to the northward of N. by E. ½ E., in order to avoid the reefs.

During the S.W. monsoon a vessel in running in may keep more over to the westward so as to bring Cape Hussan Ghorab nearly S. ½ W. of her. The soundings of the bay are generally clear sand, with an occasional patch, and there is no danger within the harbour on its western side.

Gulbraine Islands. GULBRAINE ISLANDS, about 2 miles to the eastward of Hussan Ghorab and a mile off the shore, consist of one large and two lesser rocks, having a channel between the largest and the least 300 yards wide, with 12 fathoms water; also a channel between them and the shore having 7 or 8 fathoms on the island side. The passage between the two smaller rocks is nearly dry at low water.

Sekah Island. SEKAH or GIBBOSE ISLAND, 4 miles S. ½ W. of these rocks, is in lat. 13° 55′ N., lon. 48° 28′ E., and has an elevation of 400 or 500 feet above the sea. The general depths between it and the shore vary from 19 to 33 fathoms, with 100 fathoms 2 miles outside it.

Ras Mugdha. RAS MUGDHA is a moderately elevated cape, about 8 miles East of Hussan Ghorab, having off it the island of Burughah, which, being lofty and precipitous, has

sometimes been mistaken for the cape; there is, however, a channel between them, through which the Palinurus passed, called by Captain Haines, Sanders Channel, after the officer who first sounded it. It is about a mile broad, and perfectly safe, having from 15 to 17 fathoms in the middle.

MUGDHA BAY, formed between the cape and the Gulbraine Islands, is described as a very excellent anchorage during the easterly monsoon. It appears by the chart to have regular depths, from 7 to 10 fathoms, and to be free from danger, except in the N. W. part of the bay, where there is a sunken rock about half a mile from the shore. Mugdha village is very small, and poorly supplied with the necessaries of life; the water also is indifferent. Mugdha Bay.

RAS KHELB is a low, sandy cape, 13 miles E. by N. from Ras Mugdha, the shore on either side being of the same character as the cape itself. Caution should be used in approaching it at night or in hazy weather, as it is then not easily discernible. Ras Khelb.

RAS REAHMUT, 8 miles N. E. of Ras Khelb, is considerably elevated, and is the commencement of the mountain chain which extends to within 15 miles of Maculla; it also forms the eastern boundary of the Wahidee territories. Ras Reahmut.

The coast from Ras Reahmut continues in a N. E. direction to Ras Assassah or Assur-el-Hammera, 6 miles distant, between which cape and Ras Broom, 8 miles farther, is the bay of Goolloon or Gollain, which is described by Captain Haines as an indifferent anchorage.

RAS BROOM, in lat. 14° 18½′, lon. 49° 3′ E., is a bold craggy headland, visible at the distance of 38 or 40 miles. A reef extends from it a quarter of a mile, on each side of which the water appears to be deep. Ras Broom.

BUNDER BROOM is a bay to the northward of the cape, and is a secure anchorage in the S.W. monsoon; but having the points which form it nearly North and South of each other, it is open to all easterly winds. Captain Haines recommends anchoring in 5 or 6 fathoms, with the town of Broom bearing N.W. Wood, water, and other supplies may be procured at the town. Bunder Broom.

Between Ras Broom and Ras Maculla, a distance of 15 miles, the country is a plain, enclosed by a semicircular range of mountains which terminates in these two capes; the soundings off the coast are generally pretty regular, deepening towards Maculla. Mid-way between Broom and Maculla stands the town of Fooah, the inhabitants of which appear to entertain a strong dislike to Europeans, and on Captain Haines' visit, they insulted his officers during a ramble in the valleys, notwithstanding the evident fear with which the presence of the ship had inspired them; the place is not much frequented by strangers. Inhabitants.

MACULLA is the principal commercial depôt on the coast of Arabia. The town stands on a projecting rocky point which has a small bay on each side of it. The house of the chief is in lat. 14° 30′ 40″ N., lon. 49° 12′ 20″ E., according to Captain Haines, and is situated beneath the remarkable hill called Jibbel Garrah, the circular summit of which rises above the steep cliffs commanding the town, and on which Maculla.

6 towers have been erected for its protection. The base of these cliffs is limestone, with a superstructure of white marble traversed by grey and blue veins, the surface having a slight sandy appearance; this high land can be seen at 40 miles' distance.

Conduct of the chief.

The contention for the government between the son and nephew of the old chief, Abdul Rhub, who died in 1835, caused a temporary suspension in the hitherto flourishing commerce of the place, and obliged many of the merchants to quit. The nephew, by his superior wealth and influence, succeeded in excluding his cousin and establishing himself in the government, and by his tact repaired the evil caused by these dissensions, inducing the merchants to return, so that, in the following year, the place began to resume its former prosperous appearance. "He bought," says Captain Haines, "the vessels of poor and reduced owners at a high price, employed the idle and neglected in building others, and in making new huts for themselves, and in fact completely succeeded in restoring the commercial interests that his unpardonable seizure of the chieftaincy had destroyed."

Trade.

The trade of Maculla is very considerable, and is carried on with India, the Red Sea, and the Abyssinian ports, in rice, cotton, cloths, coffee, dried fruits, &c. The horrid traffic in slaves is also fearfully encouraged by the import of great numbers of both sexes.

The duty on goods from India is 5 per cent., and vessels are charged anchorage dues of 5, 10, or 15 dollars, according to their size. The duties, according to Captain Haines, amounted in 1834 to 3,900 dollars, which in 1836 were increased to 6,000.

Maculla Bay.

MACULLA BAY may be said to extend from Ras Broom to Ras Maculla, but the name is more properly restricted to the eastern portion of this large bight, comprehended between the town of Fooah on the West, and Cape Maculla on the East. There is very deep water in the centre of the bay, the anchoring bank extending not much more than half a mile off the shore near the town, increasing to nearly a mile in width off the low sandy beach towards Fooah. Of the two small bays before mentioned near the town, and which afford shelter for boats, the western one is the most frequented. It has the town on the East, and is protected on the west side by a reef which projects a third of a mile from the shore. There is a sunken rock a short distance off the reef, with $1\frac{1}{2}$ fathoms on it; vessels, therefore, should be cautious in standing too close in near this spot.

In coming into the bay, Captain Haines recommends the Flag-Staff to be brought in one with the second tower, to the eastward on the cliffs, and when in 12 fathoms the vessel should be rounded to, which will bring her into 8 or 9 fathoms on anchoring.

There is sometimes a heavy swell rolling into the bay when the winds blow strong, but the wind usually lulls towards evening and the sea goes down.

Although Maculla harbour is reckoned one of the best on the coast, Captain Haines gives the preference to Sharma and Aden; but the ready supplies to be procured and the frequent opportunities of communicating with India render Maculla a desirable port. The natives assert that a vessel having chain cables might safely ride out the S.W. monsoon at Maculla; they also say that the wind at this season blows with great violence during the day, but decreases as the sun declines, often blowing strong enough in the morning from the N.W. to carry a ship clear to sea.

Ras Maculla.

RAS MACULLA is the narrow neck of land, projecting into the sea, S.E. of the

town. There is a rocky patch off it, about one-third of a mile to the southward, having 4 fathoms on it, with 16 or 18 fathoms inside.

The bay formed on the eastern side of Ras Maculla is called Bunder Rowaynee. Var. 1834, 4° 30′ W.

The coast from the high land of Maculla is straight, and the country is flat and barren, for nearly 20 miles to the table land, called Jibbel Dthubbah, the shore being bold and safe to approach. Immediately to the N. E. of Ras Maculla stands the fishing village of Rowgub with its mosque, and 3 miles from it the town of Bowbaish, surrounded by date trees, and possessing numerous springs of water. Ten miles farther, towards Jibbel Dthubbah, are the ruins of the once flourishing town of Shehar, formerly the seat of Government of the Kossaidee tribe, but now almost deserted, in consequence of the chief having removed his residence to another city. The population may now amount to 300 persons, the greater part of whom are fishermen. Rowgub. Bowbaish. Shehar.

JIBBEL DTHUBBAH, before mentioned, is an oblong table hill near the sea, and being entirely detached, it becomes an excellent guide for making Maculla from the eastward. Jibbel Dthubbah.

GHIULE BAZIER is a considerable town, inland to the north-westward of Jibbel Dthubbah. Tobacco, vegetables, and excellent water may be obtained there, also remarkably good dates. Its mosque may be distinctly seen from the sea. Ghiule Bazier.

SHAHAH, about 8 miles E. by N. of Jibbel Dthubbah, is a very large town, being upwards of a mile in length, and the capital of the province of the same name. The Sultan's house or castle is the most conspicuous building in the town. It occupies an elevated position, is fortified at each angle with a circular tower, and may be seen from seaward long before the rest of the town. It is in lat. 14° 43′ 40″ N., lon. 49° 40′ E., according to Captain Haines. The anchorage is an open roadstead, with regular soundings, the depths one mile off shore varying from 7 to 12 fathoms. Captain Haines recommends a position in 7 or 8 fathoms, with the principal mosque bearing North. Vegetables brought from the neighbouring villages are at all times to be procured here; and sheep may also be purchased. The water is bad. Shahah.

Yucalif, a hill 4 miles N. E. of the town, on which are the remains of a zig-zag wall, is considered the best mark for ships in running in for Shahah roads; a vessel has only to keep this hill a little on the starboard bow till the town is visible. Yucalif Hill.

HARMEE is a village 13 miles to the eastward of Shahah, situated just beneath a double hill, and having near it a grove of date trees. The coast appears by the chart to consist of steep rocky cliffs, which extend several miles on each side the town. The soundings are regular, and the shore may be approached at any part to the depth of 8 or 10 fathoms. Harmee.

Captain Haines recommends an anchorage about a mile off shore, in 7 or 8 fathoms, sand, shells, and broken coral. Anchorage.

Supplies are very expensive, and difficult to be obtained. The sheep are small and the water not very good. A duty of three per cent. is demanded from all vessels anchoring here on every article landed or purchased. Supplies.

There are numerous hot springs in the neighbourhood of Harmee; those examined by Capt. Haines had a temperature of 140°.

The coast between Harmee and Ras Sharma forms a large bay, comprehending

Coast between Harmee and Sharma.

within it the anchorages of Sharma and of several places of less note. The soundings on the coast are generally regular, the depths varying from 7 or 8 fathoms a mile off the shore, to 38 and 40 fathoms 3 miles off, outside of which the depth rapidly increases to 100 fathoms.

Sharma Bay.

SHARMA BAY is comprehended between the ruins of El Misenaut on the west, and Ras Sharma on the East, and is considered the best anchorage on the coast for shelter in the N. E. monsoon. The eastern shore of the bay runs in a S. S. E. direction till terminated by the cape, which curves round and projects to the S.W., affording protection from the S. E. winds. About 3 miles West of the Cape is a rock, called Jezerat Sharma, 70 feet high, having a channel of 5 or 6 fathoms between it and the Cape, and 10 or 12 fathoms outside.

There are several villages round the bay, which give names to the smaller bays formed by the projecting points of the shore. These small bays are used by the boats and native vessels.

Anchorage.

The most frequented anchorage is off the village of El Ghurn, in from 2 to 5 fathoms. Captain Haines anchored in $6\frac{1}{2}$ fathoms with the village bearing North about half a mile.

Bunder Shasser.

The cove called Bunder Shasser, immediately to the northward of the Cape, affords also good anchorage in 4 or 5 fathoms. It is high water on the full and change of the moon at 8h. 30m. Rise $7\frac{1}{2}$ feet. Variation of the compass 4° 39′ W. in 1835.

Tides.

Dees and Thubba.

The towns of Dees and Thubba are situated a few miles inland, in the neighbourhood of which are hot springs.

Coast towards Ras Baughat Shaw.

The coast from Ras Sharma runs in an easterly direction to Ras Baughat Shaw, a distance of 7 miles, forming a line of limestone and chalk cliffs, rising between 300 and 400 feet perpendicularly from the sea. These cliffs may be clearly seen at the distance of 25 miles. Mid-way between the two capes there is a hollow opening in the cliff, near which is the village of Dthugaum. The opening is fronted by a sandy beach, off which is an anchorage for boats.

Four or five miles North of Ras Baughat Shaw there is a mountain, called by Captain Haines Jibbel Hummoon, but marked in the chart " Sand hill." The neighbourhood is tolerably well cultivated, and has springs of good water ; it is also interesting to the antiquary from the numerous hieroglyphic inscriptions found here.

From Ras Baughat Shaw, the coast runs E. N. E. for 12 miles to Ras Gosier'h, to the eastward of which, a mile inland, stands the town of the same name. There is a square fort half a mile N. N. W. of the town.

Gossier'h Anchorage.

GOSSIER'H anchorage is very rocky close in shore, more especially in the neighbourhood of the point from which a shoal extends nearly half a mile to the southward and a quarter of a mile to the westward, but a vessel may find a safe position off the reef in 12 or 14 fathoms. Sharks abound on this coast and are caught here in great numbers, the body being eaten by the natives, and the tail and fins reserved and sent by way of Muscat to the Chinese markets.

Coast between Gossier'h and Misenaat. Ridah.

The coast to the eastward of Gossier'h for 22 miles to Misenaat is low and uncultivated, having several villages and towns near the sea, the principal of which is Ridah, about mid-way between the towns just mentioned. Ridah is the residence of the chief of the district, and contains about 700 inhabitants ; the houses of which are principally built of mud and stone, and huddled together without any apparent regard to comfort or convenience.

The trade, which is very trifling, is chiefly carried on between this place and Shahah and Maculla, Socotra, Mocha, and Zanzibar, and consists in frankincense, aloes, ambergris, and sharks' fins, the last-named articles being the most lucrative.

The water off the coast is very deep, there being as much as 20 fathoms within a quarter of a mile off the shore, suddenly deepening to 120 and 130 fathoms 2 miles off.

Twelve miles east of Ridah stand the ruins of MISENAAT, in lat. 15° 3′ N., lon. 50° 43′ E. These ruins are interesting to the antiquarian, and appear to have once formed part of an important town. The country near them is now a swamp, and traces of lagoons or harbours are visible near the ruins. Misenaat.

PALINURUS SHOAL (Abdul Kuri) is situated about 8 miles S. ½ E. of Misenaat, and was discovered by Captain Haines, in 1835, who thus decribes it:—"It extends 1,850 yards, in a N.N.E. and S.S.W. direction, and is from 150 to 300 fathoms broad, with a bottom of alternate rock and coral. The soundings round this shoal cannot be relied on, as they vary very suddenly, and do not always decrease in approaching it. The nearest land is that of Misenaat, the ruin being nearly in a line with the eastern bluff of Shichowee Gap, an opening in the mountain 10 miles inland. When on the shoal this gap lies fairly open, its western bluff bearing N. 5° W., and the eastern end of Shichowee Mountain N. 17° E. The sandy beach on the main land is not discernible." Palinurus Shoal.

Captain Haines recommends navigators to avoid this spot by passing between it and the shore, or by keeping a good offing, as he believes it to be rapidly shallowing.

The soundings near it in 1835 were as follow: North of the shoal 2 miles, 120 fathoms; N.E. 3 quarters of a mile, 120 fathoms; East 2½ miles, 96 fathoms; S.E. 2 miles, 64 fathoms; South 2½ miles, 130 to 140 fathoms; S.W. 1 mile, 80 fathoms; W.S.W. 3 quarters of a mile, 105 fathoms; West 1 mile, 130 fathoms; N.N.W. 2 miles, 140 fathoms.

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## COAST OF ARABIA, FROM MISENAAT, IN LON. 50° 43′ E., TO RAS-EL-HAD, AND THENCE TO THE ENTRANCE OF THE PERSIAN GULF.*

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The coast from Misenaat runs in an E. by N. ½ N. direction, and is nearly straight; the soundings appear to be regular, varying from 12 to 15 fathoms 2 miles off shore.

SAHIUT is about 30 miles to the eastward of Misenaat, lat. 15° 14′ N., lon. 51° 15′ E.; the Topaze, within 3 miles of it, had 8 and 7 fathoms. About 2 or 3 leagues East from it the coast is high and steep to, forming two or three small bays. When Ras Shar- Sahiut.

* The positions in the interval of coast between Misenaat and Ras Noos are given on the authority of Mr. Russell, master of H.M.S. Topaze: the latitudes appear to be 5 or 6 miles too great, but the longitudes do not

wan bore E.N.E. 6 leagues, at 4 miles distant from a steep rocky point, the Topaze anchored in 13 fathoms. Coming from the westward, the depths increase towards Ras Sharwan, the bottom sand and ooze to the westward, and black mud as the headland is approached. Towards Ras Fartak, the bottom is green mud. Come no nearer to Ras Sharwan than 15 fathoms.

Kisseen Point. RAS SHARWAN, or KISSEEN POINT, in lat. 15° 20′ N., lon. 51° 48′ E., by the lunar observations and chronometers of H.M.S. Topaze, is about 25 leagues to the E.N. Eastward of Ras Baughat Shaw. The inland part between them is high, and may be seen more than 10 leagues' distance, but the coast is in many places low, and generally safe to approach, with soundings from 30 to 40 fathoms 2 leagues off shore. Kisseen Point is high, may be seen 10 or 12 leagues, and when viewed from the westward, two sharp peaks, called the Ass's Ears, are discerned, which make it easily known, as they are near the point. When these bear N. by W. the bay begins to open; it is to the northward of the point, and has in it regular soundings, from 12 fathoms at the entrance, to 4 or 5 fathoms, sandy bottom, near the villages Kisseen, Durgah, and Sharwan, in the bottom of the bay, where ships may lie sheltered from S.W., westerly, and northerly winds. The village of Kisseen is in lat. 15° 25′ N. having a well to the westward of it, near a mile from the shore, the only place where water can be procured. There is anchorage in the bay to the westward of Kisseen Point. Ras Durgah is a high bluff, in lon. 51° 58′ E.

Ras Fartak. RAS FARTAK or CAPE FARTASH, in lat. 15° 38′ N., lon. 52° 20′ E., a beautiful promontory, is very high, may be seen at 26 leagues' distance in clear weather, and cannot be mistaken, as it projects far into the sea, rising perpendicularly in some places; when 10 or 12 leagues off it, in a southerly direction, it appears like an island with a gap in the middle. The coast between it and Kisseen Point forms a large bay comprehending several smaller ones, and it is low in several places near the sea, but inland the country is mountainous: some villages may be seen in passing along. The soundings abreast the cape are 40 and 46 fathoms, about 3 or 4 miles' distance, and the coast to the northward of it takes a direction to the westward of North, forming an extensive and deep bay, in which there are soundings proper for anchorage.
Current. The variation off the Cape was 6½° W. in 1821, 5° 50′ W. in 1827; the current ran strong to the eastward on the 18th of March.

Dofaar and adjacent coast. DOFAAR, or DHOFA, called by the natives Hammee Badgeree, in lat. 16° 59′ N., about lon. 54° 36′ E., bears N. E. by E. from Ras Fartak, distant about 50 leagues. The soundings are regular between them, and the coast, which is low in some places near the sea, is safe to approach, there being no known dangers. In this space there are four headlands: Thurbat Ali, in lat. 16° 28′ N., lon. 52° 50′ E.; Ras Sair, in lat. 16° 41′ N., lon. 53° 33′ E.; Ras Kaimar, about 6 leagues farther to the eastward; and Ras Risoute, in lat. 16° 54′ N., lon. 54° 17′ E., near to Dofaar. The high land of Segar is about 20 leagues to the N. Eastward of the Cape, the land forming a deep bay between them. Ships may anchor at Dofaar in moderate depths, from 7 or 8 to 10 fathoms. H.M.S. Leopard at anchor, had Cape Dofaar, or the

differ materially from those deduced by adjusting the points along this interval of coast, by Captain Haines' positions of Gosier'h on the West, and Ras Noos on the East. The positions given by Captain Owen of this interval of coast are as follow—Ras Morebat, lat. 16° 55′ N., lon. 54° 48′ E. Ras Jingera (here called Ras Noos), lat. 17° 7′ N., lon. 55° 7′ E. Ras Noss (here called Ras Hassek), lat. 17° 23′ N., lon. 55° 16′ E.

western extreme of the land, appearing like an island S. 80° W., centre of Dofaar Town N. 79° W., distant 6 miles; but the proper anchorage is farther in, about 1½ or 2 miles from the shore, in 6 or 7 fathoms. Between Ras Fartak and Dofaar there is said to be a place, probably Seger, with plenty of water and cattle; but these are scarce articles at most of the towns on the south coast of Arabia. At Dofaar, provisions, or refreshments, cannot be procured. The natives are armed with matchlocks, and spears, and seem shy to strangers. The town is small, and the anchorage exposed to both monsoons. The variation, in 1799, at this place, was 5° W. Seger Mountains extend nearly to Dofaar, and have deep water close to them; but the land becomes less elevated near the latter place, and the hills are partly covered with trees, which is very uncommon on the south coast of Arabia. Supplies. Natives.

MOREBAT BAY, according to Captain Smith's survey in 1791, has low land on its eastern, but high land on its northern and western sides, a range of mountains passing near the head of the bay and along its north-western shore. Ras Morebat is low and rocky, projecting to the S.W. and forming the S.E. point of the bay; it is in lat. 16° 59′ N., lon. 55° 5′ E., by Mr. Russell, and in lat. 16° 54′ N., lon. 54° 48′ E.,* by Captain Owen's survey, and 6½ leagues East from Dofaar. In working from Dofaar to Morebat, the shore is safe to approach, with regular soundings, andthe Cape may be passed within half a mile in 10 or 12 fathoms. The town, consisting of few huts, is 2 or 3 miles inside the point, opposite to which is the best anchorage, in 8 or 9 fathoms, about a mile from the shore, with the point bearing South or S. by E. Morebat Bay and town.

Captain Smith, with a convoy of 17 sail of store ships, put into this place in 1781-2, remained in the road 11 days and filled up their water. This was effected by sinking casks near the mosques; the water was brackish, but it did not injure the health of the people. Fish were plentiful; some goats, sheep, and bullocks were procured; the latter were scarce, but fodder more so. This place ought not to be chosen by ships requiring refreshments, except in cases of real necessity; a few lean bullocks, goats, or a few fowls, are all that may reasonably be expected. The inhabitants are at first shy to strangers, and although they may afterwards appear friendly, ought not to be implicitly trusted. The navigator mentioned above, says it would be imprudent for people landing in boats to venture far from the beach, or to sleep on shore in the night. The natives are generally armed with spears. Water and other supplies. Inhabitants.

It is high water about 9 hours at full and change of moon, and the tide rises on the beach 6 or 7 feet. Tides.

From Morebat Bay to the distance of 7 or 8 leagues eastward, a low, level plain fronts the sea, which seems to be about 2 leagues in breadth, and inland is bounded by the base of a ridge of steep cliffs or mountains. The west end of this ridge is directly over Morebat Bay, from whence it extends a great way to the eastward, along the north side of the low land, until it joins the coast near Ras Noos. This high ridge may be seen at 20 leagues' distance in clear weather, and the west part of it being near the bay, it is by some persons considered as the Peak of Morebat, and given as a leading mark for the port. Another peak, or high isolated mount resembling a sugar-loaf, standing on the low land to the S.E. of the town, in lat. 16° 56′ N., is also very high, and may be discerned near 20 leagues' distance: there is a second sugar-loaf hill, in about lat. 17° 11′ N., lon. 55° 2′ E., on the low land farther to the eastward, and a third near Ras Noos. Morebat Peak and Sugar-loaf.

* The observations of several navigators place it, and the other headlands, on the coast of Arabia, farther to the eastward than Captain Owen.

Ras Noos.

RAS NOOS is in lat. 17° 14′ N., lon. 55° 23′ E., according to Captain Haines' chart, this name being given to the point usually marked in our charts as Ras Jingery. The Cape hitherto known as Ras Noos is called by him Ras Hassek, and is hereafter described. The general direction of the coast between these capes is N. by E. ½ E., the land rising at once from the shore to a considerable elevation. There are no soundings under 40 or 100 fathoms until close to the land, except in the little bay on the north side of Ras Noos, where the bank extends 2 miles off shore. There are springs of good water at the head of this bay.

Kooria Mooria Bay.

KOORIA MOORIA BAY is comprehended between Ras Hassek in lat. 17° 23′ N., lon. 55° 25′ E., and Ras Gurwhou in lat. 17° 53′ N., lon. 56° 22′ E., having off it several islands. This extensive bay was surveyed by Captain Haines, of the Indian Navy, in 1837, and the East India Company have recently published his chart, from which the following description of the bay is taken.

Ras Hassek.

Ras Hassek, the S.W. point of the bay, projects from the usual coast-line in a sharp point about half a mile due East, having immediately behind it the mountain of Jibbel Hassek, backed by Jibbel Subhan, which rises to an elevation of 4,000 feet. There is no bottom at 100 and 130 fathoms at the distance of a quarter of a mile off the extremity of the cape, but the bank of soundings commences on its north side, the outer edge of the bank extending from the cape to the islands, the nearest of which, Haski, lies 15 miles E.N.E. of it. The shore towards Ras Therrar, about 4½ miles N.W. of Ras Hassek, is irregular and indented, with a small sandy cove fronting a valley about mid-way, where there is a fresh-water spring. Ras Therrar is a low sandy point, but about a mile to the southward of it the land rises into steep cliffs backed by high table land, which is the character of the western shore of the bay for 25 miles, with the exception of a spot 7 miles North of Ras Therrar, where a low, sandy beach fronts a valley in which there is a pool of fresh water. Nine miles N.E. of this sandy cove, about the centre of the range of cliffs, is Ras Menteggbid, with a rugged peak close to the northward of it. The steep cliffs terminate 7 miles N.N.E. of this cape, and the mountain range runs back for 2 or 3 miles, and after continuing in a direction parallel with the shore, again reaches the sea at Shuamea point.

Ras Therrar.

Ras Menteg-ghid.

N.W. shore of the bay.

The shore and the plain fronting the mountains is low and sandy, with some bushes on it, the coast-line being nearly straight in an E.N.E. direction. There is a sand-hill near the cliffs at the western extreme of the low lands, and a chump of trees or bushes, with fresh water near them, at the eastern extreme by the high land or "Dark Point of Shuamea."

Ras Shuamea.

Ras Mingee.

The coast from this point again assumes a bold character, being composed of steep cliffs, which run in an unbroken line for 25 miles in an easterly direction. Ras Shuamea is a point 10 miles East of the "Dark point of Shuamea," before mentioned, and 10 miles farther, in the same direction, is the point called Ras Mingee, having fresh water near it. The cliffs, about 2 miles East of Ras Mingee, are 706 feet high, from thence decreasing until leaving the shore about 2 miles farther to the eastward they terminate a mile inland. Between this point and Ras Gurwhou the shore is low and sandy for 7 miles, resuming its cliffy character about 2 miles West of that cape.

Ras Gurwhou, and Ras Sherbedaht.

Ras Gurwhou and Ras Sherbedaht, a cape 2 miles East from it, as well as the intermediate coast, have the steep rocky character of the cliffs already described. There is a sand-hill a mile to the westward of Ras Gurwhou, and the cliffs here assuming a concave outline, are fronted by a piece of low land, the shore of which

appears to be lined with rocks. The coast at Ras Sherbedaht suddenly alters its direction from East to N.N.E. and N.E. towards Ras Saugra.

Kooria Mooria Islands. The Kooria Mooria Islands are five in number, *viz.* Haski, Soda, Helaaneea, Jibleea, and Ghurzoud, or Rodondo. The first four are situated on the edge of the bank of soundings, and lie in a line nearly East and West, parallel with the north shore of the bay, from which they are distant about 23 miles. They are generally bold and rocky, their hills, for the most part, rising into regular conical peaks.

Haski Island. Haski, the westernmost island, lies, as already stated, about 15 miles E.N.E. of Ras Hassek. It is $1\frac{1}{4}$ miles long from North to South, and about half a mile broad, having high peaked hills near its southern point. The edge of the bank passes very near the south point of this island, there being, half a mile from it, no bottom at 145 fathoms. The average depths round the island, at a mile distance from its shore, are from 25 to 30 fathoms, and there is a rock which dries at low water half a mile off its western shore. The rock bears about S.W. by W. $\frac{1}{2}$ W. from the N.W. point of the island, and has a channel of 16 fathoms inside it.

Soda Island. Soda Island lies 12 or 13 miles East of Haski, and is 3 miles long from East to West, and $1\frac{1}{2}$ miles broad. The land is high and formed into peaks, the highest of which, near the centre of the island, attains an elevation of 1,310 feet. Its shores are rocky and pointed, and there is a sunken rock surrounded by a bank, about half a mile to the westward of its S.W. end; there appears to be a narrow channel inside this rock, having 5 or 6 fathoms in it. There is also a ledge of rocks extending from a point near the middle of the south shore, which shelters to the S.E. a small cove, formed on the western side of the point. The soundings round Soda, at a mile distance, vary from 10 to 40 fathoms, the bottom being of sand and rocks on the east and west sides of the island; sand and shells, and sand and coral, on its north side, and grey sand on its N.W. side. The edge of the bank passes within half a mile of the south shore of the island, there being no bottom at 95 and 100 fathoms at that distance off. There is a well near the S.E. point.

Helaaneea Island. Helaaneea, the largest of the Kooria Mooria group, is about 16 miles in circumference, and is situated $4\frac{1}{2}$ miles to the eastward of Soda. Its lofty granite mountains terminating in numerous peaks give it a rugged appearance, and it is further remarkable from the bold projecting promontory of limestone which forms the northern part of the island. The extreme point of this promontory is called Ras Helaaneea or Erekh Erahee, and is in lat. 17° 32′ 43″ N., and lon. 56° 7′ 17″ E. This "limestone bluff" is 1,645 feet high, and presents a rugged and nearly perpendicular cliff to the sea for upwards of a mile on each side the cape. There are shoals and rocks extending nearly 2 miles off the west point of the island. One of these rocks, situated 3 quarters of a mile from the point, dries at low water spring tides. The east point of the island, called Ras Saar, is fronted by a rocky bank which is continued from the cape two miles along the S.E. shore, off which it extends nearly a mile; and there is a 3-fathom patch off the south point, bearing S.E. by S. from it a third of a mile. A large bay is formed between the North and the East points of the island, in which there appears to be good anchorage in from 7 to 14 fathoms. There are a few huts on the N.W. side of the islands, and wells in several places near the shore. The bank of soundings terminates about 2 miles South of the island, beyond which distance there is no bottom at 140 fathoms.

Jibleea Island. Jibleea Island lies between 12 and 13 miles East of Helaaneea, its west end being nearly in the meridian of Ras Gurwhou. It is not more than 3 or 4 miles in circumference, and consists of several remarkably regular peaked hills, with comparatively

low land near its S.W. point, which projects considerably from the main body of the island. There is a dangerous rock bearing E. by S. 3 miles from the east point of the island; it dries at low water spring tides and has deep water close to it on all sides. There is a channel between it and Jibleea Island, with depths in it varying from 8 to 15 fathoms. There is also a rock above water called the Well Rock, off the S.W. point, from which it bears S.S.W. distant half a mile, and another called Four Peaked Rock, half a mile W.N.W. of its north point; the latter has a ledge extending from a third of a mile to the N.W. The edge of the bank is between 1 and 2 miles South of the island.

Dangerous rock.

Ghurzoud, or Rodondo Island.

Ghurzoud, or Rodondo Island, the smallest of the group, is situated within the others, and bears N.E. by E. 6 miles from Ras Helaaneea. It is not above a mile in circumference, but its conical peak is 230 feet high. There are 2 rocks above water close to its eastern point, and 2 sunken ones on its N.W. side, the soundings being deep all round it.

Bank of soundings.

The bank of soundings in Kooria Mooria Bay, commencing at Ras Hassek, on the West, its edge curving a little to the northward and then continuing in a direction due East, passes within a mile or two of the Kooria Mooria Islands, all of which except Ghurzoud are situated near the edge of the bank. The soundings in the central part of the bay are regular, varying from 30 to 40 fathoms, decreasing towards the shores and the islands. The bay is somewhat shoaler off its western than its northern shore, averaging from 18 to 30 fathoms, 2 miles from the land. The quality of the bottom is in general sand and shells or sand and coral, but occasionally rocky near Ras Ghurwou and the islands. The western passage into the bay between Cape Hassek and Haski Island is 15 miles wide, apparently requiring no caution except when within a mile of Haski, where there is a rock which dries at low water, as already described.

Passages into the bay.

The passage between Haski and Soda is 12 miles wide, the depths in the centre varying from 40 to 60 fathoms. The rocky bank extending about a mile to the westward of Soda appears to be the only danger.

The entire width of the passage between Soda and Helaaneea Islands is about 4 miles, but the rocks off the west end of Helaaneea reduces it to half that width.* There are from 12 to 20 fathoms in the clear passage, and the east side of Soda, though rocky, may apparently be safely approached to within half a mile.

The passage between Helaaneea and Jibleea Islands is 12 miles wide, with from 40 to 46 fathoms in the centre. It appears perfectly free from danger, except when near Jibleea, when the ledge, above noticed, off the Four Peaked Rock on its N.W. side must be avoided. Ghurzoud Island is situated about 6 miles inside this passage, and may apparently be passed with safety on either side within less than a mile.

In passing to the eastward of Jibleea Island the dangerous rock, lying 3 miles off it, must be avoided; the passage between it and the island appears quite clear, with depths from 10 to 16 fathoms. There are 130 and 170 fathoms water $2\frac{1}{2}$ miles East of the rock.

Tides.

The flood tide on the northern side of the islands runs to the westward, and to the eastward on their southern side. It is high water on full and change, at 8h. 20m. Rise $6\frac{1}{2}$ feet. Variation of the compass 2° 45′ W. in 1837.

Currents during the easterly monsoon.

From Ras Fartak to Ras Noos, the currents often run against the wind during the easterly monsoon, but amongst the Kooria Mooria Islands they are very fluctuating,

* In 1820 or 1821, an English ship *is said* to have been wrecked in the night, when attempting to make this passage.

and frequently set to the N. Westward, into the bay, rendering it unpleasant if becalmed close to these islands; it is, therefore, preferable to pass outside of them, unless when land and sea breezes prevail near the coast, by which a ship may make progress against the monsoon, keeping near the land.

The land about Ras Ghurwhou is white and level, like the North Foreland, and destitute of any distinguishing marks; but northward of Cape Saugra, for about 7 leagues the land becomes higher; from the latter cape the coast turns sharp round to the northward, and forms an extensive bay. Between these capes there are soundings of 40 and 30 fathoms, within 2 or 3 miles of the shore; but farther out, with Cape Saugra N.N.W. about 4 leagues, and Ras Ghurwhou W. $\frac{1}{2}$ N., there are 20 fathoms rocky bottom. Cape Saugra, and the coast near it.

Ships ought to be attentive to the lead in approaching Cape Sangra, as reefs project from the shore near it, and in standing toward the shore to the northward, do not run far into the bay, where the water is shoal, only 10 fathoms when the cape bears about W. by S., and the northern extreme of the land N.W. by N.; but with proper attention, the lead will give sufficient warning, by showing decrease of depth.

SAUGRA BAY is very extensive, being comprehended between Ras Saugra to the S.W. in lat. 18° 9′ N., lon. 56° 35′ E., and Ras Madraka, 80 miles to the N.E., in lat. 18° 58′ N., lon. 57° 51′ E., by Captain Owen, who thus describes the bay. "The western coast of this great bay is low and apparently shallow, trending due North from Cape Shaugra, about 25 miles, and its northern shore due East, 15 leagues. This immense bay seems to have no dangers of which the lead will not give sufficient warning. Our pilot said it might be coasted in any depth from 4 or 5 fathoms and upwards. We crossed the bay in 9 fathoms, and could not see its shores in the bight from aloft. We saw not the slightest appearance of vegetation or animation on any part of the shore, except at Cape Madraka, where there were a few huts and people." Saugra Bay.

Ras Saugra is a double cape, the points being distinguished by Captain Owen, as Ras Saugra North, and Ras Saugra South: it is the position of the northern point which is given above, the other being 3 miles South of it. There is a small port or bay between these two capes used by the coasting vessels as a mart for salt. The cliffs which bound these headlands attain an elevation, according to Captain Owen, of 200 or 300 feet. Variation 2° 4′ W. in 1824.

RAS MADRAKA, or CAPE ISOLEETE, in lat. 18° 58′ N., lon. 57° 51′ E., by Captain Owen's survey, is high, and may be seen 15 or 16 leagues in clear weather: to the westward of it, there is some double table land, about 2 or 3 miles in length, here the soundings are regular, 9 or 10 fathoms close in shore. The high part of the cape has on its summit a remarkable rock (called Tagayat Abak or Abak's Hat), resembling a building when viewed at a considerable distance, and when near, a low point terminating in a small rock is seen projecting 5 miles from the cape to the north-eastward. This is generally called Low Point, to which the name Tagayat Abak is also applied,* from which the coast, that had an easterly direction on the west side of the cape, now turns sharp round to N. by W. Variation off this cape 2° 9′ W. in 1824. Ras Markas is a point of land in lat. 19° 10′ N., lon. 57° 41$\frac{1}{4}$′ E., by the survey, and 4 leagues N. by W. from Ras Mandraka; and 4$\frac{1}{2}$ leagues farther north, is a low point called Kewherat, as far as which point the coast appears clear, but from which the Ras Madraka.

* This seems to be Jezerat-ul-Humr, the rocky island seen by the St. Carlos.

shoals, which render the passage inside Massera difficult and dangerous, are said to extend.

Dangers. When a ship is 3 or 4 leagues to the northward of Low Point, the coast should not be approached, on account of many dangerous shoals extending far out, from hence to the Island of Massera. Captain Smith, with the convoy of store-ships, in working along the coast to the northward, got on the southern part of these shoals, where they had great overfalls and shoal water, on some of the rocky patches. On one of these, the San Carlos had $3\frac{1}{2}$ and 4 fathoms rock, with a point of land like the extremity of an island bearing N.W. 5 leagues, shoal cliff W. by S. about 7 leagues, and Cape Madraka S.S.W., then in about lat. 19° 28′ N.

Massera Island. MASSERA or MAZEIRA ISLAND is rather low and rugged, extending about $12\frac{1}{2}$ or 13 leagues, nearly N.N.E. and S.S.W., and having hills joined by low land, appears like two islands, when seen from the eastward. By Captain Owen's survey, the south Point, called Aboo Rassas, is in lat. 20° $7\frac{1}{2}$′ N., lon. 58° 38′ E.; the east point, called Ras Ya, or Ja, in lat. 20° 30′ N., lon. 58° 57′ E.; and Ras Hulf, or Alif, the north point, in lat. 20° $40\frac{1}{4}$′ N., lon. 58° 54′ E.

Captain Owen, who coasted the outer shore of this island, in 1824, thus notices it. "By the advice of the pilot we steered South to make Massera Island, and lay to, in from 56 to 50 fathoms until 6 A.M. At day-light saw Massera from S.W. by W. to S.S.W.; shoaled regularly to 42 fathoms, and hauled in for Ras Hulf or Alif, its north point, which makes like a long narrow spit projecting from the north extreme of the island. We shoaled gradually to 36 fathoms, when Ras Hulf bore S.W. by S. 6 or 7 miles, and then steered South, carrying from 34 to 40 fathoms, until within 2 miles of Ras Ya, or Heeah, the east point of the island. Had one cast of 19 fathoms, but deepened again immediately. The soundings were very irregular, varying between 22 and 35 fathoms, in which latter depth we anchored at sunset, about 7 or 8 miles South of Ras Ya, and as much from the coast abreast of us. The coast between Ras Hulf and Ras Ya forms a deep bay, appearing from aloft to be shallow and foul." "We saw Abdullah Reef from the deck, and our pilot said there was a good channel within it, with 4 or 5 fathoms; if it be so, this reef must cover a good port."

"In the bay between Ras Hulf and Ras Ya, there is a place called Hastelleagh, where they fish for whale."

"About 2 miles South of Abboo Rassar, the south point of Massera, there is said to be a rocky reef with 4 or 5 fathoms on it. Of the shoals inside Massera we determined nothing further than that a course S.W. by S. leads clear outside of them."

Gulf S.W. of the island. Ships ought to avoid the gulf between Ras Madraka and Massera Island, on account of its dangers, for it would be imprudent to run for the island in the S.W. monsoon when blowing strong, or at any other time when the weather is not clear, lest they should be set into the gulf by the uncertain currents, which at times prevail. This was experienced by the Royal Admiral, Captain D. Simmons, bound from the Strait of Sunda during the S.W. monsoon, which ship passed through between the island and the main, in August, 1772, and was nearly lost. They were in lat. 20° 0′ N. by noon observation August 16th, and on the 17th, in the evening, had soundings, stood to the eastward, but shoaling the water, anchored till day-light, found a current setting to the northward. In the morning, with thick weather, weighed and endeavoured to work out, with strong South and S.W. winds, but shoaling on each tack, anchored again. On the 18th at 4 P.M., the weather clearing up, weighed to search for a passage between Massera Island and the main, or a place of safety; steered N.N.E., North and

(Proceedings of the Royal Admiral, Capt. D. Simmons.) (Passage inside the island.)

N. by W., in soundings of 6 and 7 fathoms for some time, then shoaled gradually from 7 to 4½ fathoms; steered then N. E., E. N. E., and East, got 3 fathoms and anchored. Saw Massera Island bearing from E. S. E., to South, distant 2½ or 3 leagues; the water fell 2 feet and the ship struck. At 8 P.M., the water began to rise, making the time of high water 10 hours 48 minutes on full and change of moon; the rise of tide 5 feet. Variation 5° 56′ W. Tides.

On the 19th, in the boat, found 4 fathoms water, N.W. by W. 1½ miles from the ship, weighed, and anchored there. On the 20th, a pilot came from the island, who agreed to carry the ship between the island and the main: to the eastward, between the island and the ship, had from 4 to 3 fathoms, then deepened gradually to 4, 5, 6, and 7 fathoms; to the westward, had 4½ fathoms, to the distance of 2 miles from the ship.

On the 21st, at half-past noon, weighed, and stood S. E. by E. towards the island, in from 4 to 3 fathoms, deepening gradually to 6 fathoms; then bore away East, E.N.E. and N.E., in 6 and 5½ fathoms, till near the island, and anchored in 5 fathoms, soft sand and shells, abreast the town, the island bearing from N. E. by E. to S.W. by S. off shore two miles; observed lat. 20° 32′ N. Variation 5° 36′ W.*

On the 26th, weighed at 2 P.M. and steered along the island from N.N.E. to N.E. in 5 to 5¾ fathoms: at three, a large sand-bank above water, which forms the channel, bore N.W.; kept it at the distance of half a mile, the island at 3 miles' distance, and the main about 2 miles; had from 4¾ to 4¼, and a cast or two of 6 fathoms. When the Island of Massera bore from S.W. to N. E. ½ E., distant 1½ or 2 miles, anchored in 4 fathoms water, to sound round the ship; found no less than 3 fathoms. At 8 A.M., weighed and steered along the shore, N. by W. to N. E. in 5 to 7 fathoms, at times only 3½ fathoms. At 11 anchored in 4½ fathoms water, being then through the passage, the north end of the island bearing from S. ¼ W. to W. S.W. distant 3 miles; observed lat. 20° 48′ N. The smallest depth in going through this passage was ¼ less 3 fathoms at low water.

Admiral Blankett's squadron saw the Island Massera, in 1799, and had very irregular soundings near it, but saw no dangers. They passed Cape Isolette November 27th, and reached Ras-el-Had December 1st, having experienced a current setting to the N. Eastward 1½ miles per hour. Passage of Admiral Blankett's squadron.

Many ships have got into the Gulf of Massera, when bound to the Persian Gulf in early times: the Nassau, bound from England to Gombroon, fell in with the island Massera, 26th November, 1694, and had soundings from 25 to 15 fathoms, with the south extremity bearing E. N. E. several leagues distant. She was from this time till 28th December working round outside the island, against strong southerly currents, with variable winds from eastward, and frequently obliged to lie at anchor. Around the southern part of the island, also along its eastern side, soundings were got within 4 or 5 miles of the shore, and which extend several leagues from its southern part. With the island bearing from N. by E. ½ E., to E. N. E. 2 leagues distant, had 7 fathoms soft ground on a bank, deepening inside of it to 10 and 11 fathoms, then decreasing to 3 fathoms within half a mile of the shore. Proceedings of Capt. Lloyd, of the Nassau.

From the 8th to the 18th December, she lay at anchor on the east side of the island, extremes from N. N. E. ½ E. to S.W. by S., in 30 fathoms soft ground, off shore 3 or 4 miles. Here water was obtained by digging a well on the shore, but it was rather brackish. Some sheep and goats were also purchased, and a cow for 6 dollars, from a few natives found here, who were very poor.

* Captain Owen made the variation 0° 9′ West, near the east side of the island, in 1824.

Captain Lloyd, of the Nassau, landed on the northern part of the island, and found 3 or 4 fathoms water, within a musket-shot of the N. E. point, but a dangerous shoal projects from the north point. About 3 leagues round to the southward of the N.W. point, a shoal was seen about 2 miles within the island, between it and the main land, forming a double channel, but there appeared no safe passage for a large ship inside the island. There seemed to be a rise of tide, nearly three fathoms perpendicular at this place.

Tides.

Ras Jibsh.

RAS JIBSH, in lat. 51° 26′ N., lon. 51° 12′ E., bears N. by E. ½ E., from Ras Hulf, the north point of Maziera Island, and is in lat. 21° 26′ N., lon. 59° 12′ E., by Captain Owen, who thus describes the cape. "It appears when first seen like an island, and is remarkable from its having two or three hummocks on it. One of these hummocks is higher than the rest and is crowned with an old tower or tomb, which however is not distinguishable until near it." Abreast the cape at about 2 leagues' distance, Captain Owen had 14 fathoms, fine sand, which is the general character of the bottom on this part of the coast.

Ras Roois.

RAS ROOIS is 45 miles N. E. by N. from Ras Jibsh, and consists of three cliffy points with a few sand-hills one to two miles in shore. Captain Owen anchored off the coast in lat. 21° 51′ N., and lon. 59° 36′ E., in 17 fathoms, having carried the same depth round the three capes of Roois from two to four miles off shore. "This anchorage," he says, "was not far from Lasharra, where part of the crew of an English vessel were murdered, an event which caused the war of Beniboo Ali."

Ras el Hubba.

RAS EL HUBBA, in lat. 22° 14′ N., lon. 59° 49′ E., by Captain Owen, is a broken or rugged cape as its name implies; its cliffs are about 60 feet high, and are the commencement of the range of high land which extends northward to Ras-el-Had; the coast to the southward is sandy. Ras Jins (Fairy Cape), is about 4 leagues to the northward of Ras-el-Hubba. About two miles inland of Ras Jins, is the mountain called Jibbel Shefannat, "whose obtuse cones," observes Captain Owen, "mark the extremity of Arabia Felix, and are good indications for Ras-el-Had from the north or south."

Ras-el-had and coast from Massera.

RAS-EL-HAD,* in lat. 22° 33′ N., lon. 59° 48′ E., called erroneously Cape Rasalgat, bears from the north end of Massera Island, N. N. E. ¾ E. distant about 40 leagues: it is, according to Captain Owen, "a low sandy point on which are a few date trees, and apparently the ruins of a small fort and village, but is better marked by a Sheik's tomb on its extremity, and by the sudden turn of the coast from East to S. S. E. towards Ras Jins: the coast between Massera Island and this cape is bold to approach, with soundings 6, 5, and 4 leagues from it, until within 10 or 12 leagues of Ras-el-Had, where they do not extend above 2 leagues from the shore, and abreast the cape, no ground is obtained at 3 or 4 miles' distance. The coast is mostly barren, moderately elevated. From Ras Jins to Ras-el-Hubba, steep rocky cliffs form the coast, about 30 or 40 feet high, but it becomes sandy and shallow to the westward, with good anchorage, and plenty of fresh water.

Navigators have given the name of Ras-el-Had to different points of that high land, which forms the eastern extreme of Arabia, and which runs nearly North and South

* Signifying "Cape of the Boundary," or, according to Captain Owen, "Flat Point."

for 19 miles. We have here followed Captain Owen's decision, who had the advantage of an Arab pilot, on whose authority he applies the name to the northern point of this highland.

His Majesty's ship Liverpool, in 1819, made Ras-el-Had in lon. 60° 5′ E., measured by chronometers from Bombay, allowing the latter in lon. 72° 57¾′ E. Captain Moresby in H. M. S. Menai, in 1822, made it in lon. 56° 56½′ E. by chronometers; and other navigators have placed it about the same longitude measured from Bombay, assigning to the latter the longitude mentioned above. But as Bombay is now placed 3 miles West of the position here assigned to it, Ras-el-Had will require a westerly proportionate allowance of 3 or 3½ miles.

The mountains over Ras-el-Had are uneven, about 6,000 feet high, called Jibbel Huther, or Green Mountains, and may be seen 20 leagues in clear weather; but facing the sea, the coast is low and level from the cape to the westward for a considerable distance. Variation 5° 20′ W. near it in 1810; but Captain Owen's survey made it 2° 7′ W. in 1825.

Captain Moresby, in H. M. S. Menai, passed from Zanzibar to Muscat in August, 1822, and had very changeable and strong currents, mostly setting to the S. Eastward when to the south of Socotra, and afterward to the N.E. and eastward, out of the Gulf of Aden. He made the land 26th August at Ras Roois, and placed it in lat. 22° 0′ N., lon. 59° 46′ E., by chronometers, although no distinct head-land could be discerned: here the land was higher than between it and Ras-el-Had, rising in cones gradually in height, until they become a cluster of hills, separated by deep ravines, having a sterile and forbidding aspect, without a tree or bush. No bottom was got 7 miles off shore with 90 fathoms line, but ground was obtained at 40 fathoms about 6 miles from the shore, decreasing gradually to 24 fathoms, about 3 miles off it; and in sailing along at this distance, passed over a bank of 16 to 12 fathoms coarse sand and shells, then suddenly deepened to 38 fathoms about 3 leagues off shore, and shortly afterward had no ground with 50 fathoms. At noon, Ras-el-Hubba bore S. 44° W., and Ras-el-Had N. 10° W., distant from the shore 3½ miles; made the former in lat. 22° 8′ 36″ N., lon. 59° 52′ 36″ E. Variation 6° 10′ W.

Ras Roois.

Moresby bank.

CHALLENGER BANK, discovered August 9th, 1830, by H. M. schooner of this name, when the sea was perceived to change colour suddenly, with ripplings at 1½ P.M., and on sounding, two casts of 13 fathoms were got, then soon after, no ground at 65 fathoms, the sea having resumed its natural colour. From the appearance of discoloured water, the bank seemed to be three miles in length, and half a mile in breadth, situated in lat. 22° 29′ N., lon. 60° 29¼′ E., or nearly 40 miles distant from Ras-el-Had, according to the observations of G. C. Dowers, master of the Challenger.

Challenger Bank.

From Ras-el-Had, the coast extends W. by N., W. N. W., and N. W. by W. 12 or 13 leagues to the high land of Kalhat, being low near the sea, but high in the country. In this space, there are several villages, inhabited chiefly by fishermen; that nearest the cape, called Jarahm, or Masera, is small, and is situated on a low point of land, in lat. 22° 34′ N. at a creek, about 3 or 4 leagues to the westward of Ras-el-Had, with some tombs or white buildings, and several trees near it.

Coast to Kalhat.

BUNDER JERAHM, according to Captain Owen, is a fine harbour, having a

depth fit for any vessel, but a narrow entrance; there is also another fine port 3 miles to the eastward of it, called Hajur Bunder.

The coast from hence takes a W. N. W. direction, to a town called Soor or Zoar,* distant 4 or 5 leagues. From Ras-el-Had to Soor there are soundings near the shore, but none between the latter and the high land of Kalhat. At a considerable distance, the easternmost part of this high land seems to form a cape, but it projects very little into the sea; in clear weather, it may be discerned about 20 leagues.

Ras Aboo Dahood, or Cape Kuriat. Devil's Gap.

RAS ABOO DAHOOD,† or RAS BADAUD, or CAPE KURIAT, in lat. 23° 21′ N., lon. 58° 59′ E., by the survey of Captain Owen, is easily known by a deep chasm in the high land, about 2 leagues to the southward, called the DEVIL'S GAP: in January, February, and March, strong gusts of wind blow from it, which will lay a vessel on her beam ends, if not prepared against them, but they generally give sufficient warning.

When Cape Kuriat bears about S. S. W., it is nearly in one with the Devil's Gap, which is not conspicuous at this bearing, and when the cape bears South, the gap is shut in behind it. The Devil's Gap is in lat. 23° 3′ N., distant about 11 leagues from Muscat, being an excellent mark for knowing the land. Under this gap is said to lie the anchorage of Maculla Wabar.

Coast to the southward of Cape Kuriat.

The coast to the southward of Cape Kuriat forms a bay, having several villages and soundings in many places near the shore, between it and the high land of Kalhat; particularly from the village Tiwi, which is six or seven leagues to the southward, there are regular soundings to Cape Kuriat, where a ship may anchor in 14 fathoms good ground about two miles off shore, and be sheltered from the north-westers by the projecting land of the cape. In the bay, south of Cape Kuriat, there is a village of the same name, and a small island near the shore. Around the cape, regular soundings are got from 25 to 30 fathoms, 3 or 4 miles off shore, which extend 3 leagues to the westward; ships may, therefore, anchor here, when it falls calm.

Natives inhospitable to strangers.

The government of Muscat sometimes extends to Ras-el-Had, although it is not safe for Europeans to land at the villages near the cape, because the inhabitants are inhospitable to strangers, and the Bedouins, or roving Arabs, often keep some of these villages or towns in subjection. The coast abounds with excellent fish, which, with dates, are brought off by the country boats to ships passing near the villages.

Between Cape Kuriat and Muscat, there is a projecting point which is sometimes mistaken for the cape, from which it bears about N.W. by N., and from hence the direction of the coast is nearly the same to Muscat Point, the distance between it and the cape being about 8 or 9 leagues. All the land in this place is high and uneven, rocky towards the sea, of barren aspect, no soundings to be had except very close to the shore.

UL HERAUN, about 4 leagues to the eastward of Muscat, is an island, forming a fine harbour, by Captain Owen's description, having a clear and deep entrance from the eastward, but to the westward it is shoal, although eligible for small vessels. Abundance of excellent water may be obtained here, but no firewood.

Muscat Cove.

MUSCAT, or MASKAT COVE, in lat. 23° 38′ N., lon. 58° 41′ E., or 14° 17′ W.

* This was one of the towns frequented by the pirates, which infested the Persian Gulf some years ago.

† Or "Cape of Father David."

from Bombay, by good chronometers,* is formed by high land to the southward and westward; and on the east side, by an island, which is joined by rocks to the peninsula on which the town is situated, the entrance into the cove being from the northward.

The island that forms the cove is by some called Muscat Island, although it is joined with, and appears as part of the main land; but that generally called Muscat Island or Fahel, is a brown barren rock, 4 or 5 miles farther to the N. Westward, distant about 3 miles from the shore, and situated to the northward of Muttra Point. It is called Fahel by the Arabs, having a safe channel with 10 and 12 fathoms between it and the main, but is steep to, on the outside. This island is a good mark for knowing the openings to Muscat Cove and Muttra Harbour. Fahel Island.

Anchorage under Sudaap Point. Along the shore about Muscat, the current generally sets with the wind, on which account, if a small ship encounter a N. Wester close to Muscat Point, and be not able to get into the harbour, she may find shelter about 2 miles to the southward, by anchoring under the point of land that forms the north side of Sudaap Cove; but this may not be always advisable in a large ship, as the anchorage is near the shore. A little to the northward of Sudaap Point, there is a rock called the Great Pyramid, with 5, 6, and 7 fathoms water between it and the shore. Close to the south point of the island that forms Muscat Cove, there is another rock called the Little Pyramid; and close to the north point of the same island, or Muscat Point, there is a rock or islet called Fisher Rock. The soundings close to it and the island are from 7 to 9 fathoms. There is good anchorage at the entrance of the Cove in 10 fathoms, with Fisher Rock E.N.E., and Muscat Island N.W. ½ W.

To enter Muscat Cove. In approaching the entrance of Muscat Cove, there is no danger, nor any anchoring ground, till within half a mile of the rocks. With a southerly wind, it is difficult of access, on account of variable and sudden gusts, which then blow over the rocks, but in such case a ship may anchor in 15 fathoms at the entrance of the cove; if farther out, she ought to make a short tack, or stand to the westward into Muttra Harbour, where is good anchorage, in 9 or 10 fathoms, and a supply of provisions may be obtained the same as at Muscat: or she may weigh in the morning from Muttra with the land wind, and proceed to Muscat Cove.

A northerly wind is fair for running into the cove, but it frequently blows from that direction, so as to start the anchors of ships riding there. Within, and also outside the cove, the bottom, which is sandy, is indifferent holding ground. It is prudent to go in, if a ship intend to remain only 24 hours, for it is dangerous to lie outside; on making the signal a pilot will come off, and the sarang, or master attendant of the port, is allowed a remuneration for giving assistance to ships entering, or mooring in the cove.

The entrance of Muscat Harbour, or Cove, is protected by a fort on each side, and there is another fort close to the town that commands the inside of the Cove, where the depths of water are 4 and 5 fathoms between the two western forts: it is here that ships generally moor.

* By Captain J. A. Pope, Captain W. Richardson, and Lieutenant Eatwell, agreeing within a mile of each other. Captain Moresby, in 1822, made it in lon. 58° 46′ E. by chronometers, measured from Zanzibar, and in 58° 38½′ E. by observations of sun and moon. Capt. Owen made the place in lat. 23° 37′ N., lon. 58° 35′ E.; but he considers Bombay to be in 72° 51′ E.; therefore, his chronometric admeasurement of the difference of longitude between Muscat and Bombay corresponds nearly with that given above. The late survey of the Persian Gulf and eastern coast of Arabia, by the officers of the Company's Marine Service, places Muscat in lat. 23° 38′ N., lon. 58° 41½′ E., differing only half a mile from the longitude here adopted.

Refreshments. Although the coast about Muscat seems sterile, composed of black rugged rocks of forbidding aspect, the country inland* affords abundance of fruits and vegetables of various kinds, from April to September, which may be procured in the market at moderate prices: limes may be had at all seasons, bullocks, sheep, and fowls, are generally got at reasonable prices. Rice, dholl, and other grain, may also be purchased. The fish of Muscat are the principal support of the inhabitants, being very plentiful, and of excellent quality. Firewood is scarce, being brought from Burkha.

Water. It is proper to use the ship's casks in watering, otherwise, the natives will bring it off in bulk, sometimes filled into oily boats. In this case, it will soon have a disagreeable smell, although very good if taken clear from the reservoir, which is near the sea, the water being conducted to it from a considerable distance inland.

MUTTRA HARBOUR is between 2 and 3 miles to the westward of Muscat, it is about half a mile wide, with regular soundings from 3 to 8 fathoms, and is open to the N.E. The town of Muttra is at the head of the harbour, and there is another town called Aubug, on its western shore. The population of Muttra is more numerous than that of Muscat.

Current. In the S.W. monsoon, the current sets strong to the westward in the channel within Muscat Island, and from thence along the shore to Burkha.

Burkha. BURKHA, in lat. 23° 42′ N., lon. 57° 59′ E., is a town about 40 miles to the westward of Muscat, and is the summer residence of the Imaum. It is well fortified, and may be known by a number of trees. The anchorage is in 5, 6, or 7 fathoms, about 2 or 3 miles off shore, the coast from Muscat being clear, with regular soundings, the ruined fort of Swardy is about 3 leagues, and Seib village about 6 leagues to the eastward of Burkha. Between Seib and Burkha, about 8 miles off and parallel with the coast, lie the three groups of rocky islets called Damaniatte, or Damisetto Rocks, Jezerat Jenne, and Burkha Islands. Between which groups, a vessel may pass in soundings from 12 to 19 fathoms; and the channel inside of them is also safe, with regular soundings from 6 fathoms near the shore, to 15 or 16 fathoms near these rocky isles. Another group of rocky Isles, called Swady or Burkha Isles, lies close to a low sandy point 7 miles to the W.N.W. of Burkha, having no passage for ships between it and the point, but the channel between it and the other groups to the eastward is safe, with soundings of 12 to 17 fathoms. There are 6 or 7 isles in each group, and one of the Burkha Isles is flat, with a rock on it like a turret. As the ground is loose in Burkha Road, ships should not anchor under 7 or 8 fathoms, that they may be able to clear the shore under sail, if they happen to part their cables.

The Minerva at anchor in 7 fathoms loose sandy bottom, had Burkha Town bearing South 3 miles, Swady Isles W.N.W. ½ N. 6 miles, the isles in the offing from N.E. by N. to E.N.E. ½ N. off the nearest about 3 leagues, extremes of the low land being a

* The Pass from Muscat to the interior is strong, leading through a narrow road cut between two hills.—Captain Moresby, in 1832, went 8 leagues inland, and visited the hot springs, which gush from a rock with great force, and are about 20 miles to the westward of Muscat. The water was too hot to bathe in, and when drank cold, had a strong Chalybeate taste, but is the purest and most agreeable water in the country. These springs irrigate an extent of land planted with date trees, and although the water ran over the land so warm that you can scarcely bear your hand in it, the trees are nevertheless the finest in the country; and the herbage also luxuriant. This is a small spot amidst a wild of broken mountains, in a parched and arid country, where the Imaum has several gardens, in which a few pomegranate, fig, and orange trees flourish, but not sufficient to supply the quantity offered for sale at Muscat.

continued grove of date trees from W. by N. to E. by S., observed lat. 23° 44′ N., lon. 57° 54½′ E., by lunar observations.

About 9 leagues to the W.N.W. of Burkha in lat. 23° 51½′ N., lon. 57° 32′ E., stands the Town and Fort of Suick, on a projecting part of the coast. Suick Town.

SOHAR TOWN and Fort, about 16 leagues to the N.W. of Suick, is in lat. 24° 21½′ N., lon. 56° 52′ E., and 9 leagues farther is the town of SCHENAS, in lat. 24° 45′ N., lon. 56° 33′ E. The anchorage at Sohar is in 6 fathoms mud, with the Fort S.W. ½ S., and a small peaked hill W. by S. ½ S., off shore 2 miles. Here H. M. S. Chiffonne anchored; and at Schenas she anchored in 3¼ fathoms, about 700 yards from the shore, to cover the landing of the troops in the expedition against the Pirates of the Persian Gulf, in 1810. Hussafine is about 2½ leagues to the S.S.E. of Schenas, with the village of Nobbure about a mile to the South of the former, in a bay, where the direction of the coast changes from N.W. more to the northward. Coast from Sohar Town to Schenas.

From Burkha to this bay, the direction of the coast, here called Battnah, or Oman, is about W. by N. till 6 leagues beyond Suick, then it trends about N.W. to Hussafine Bay, and afterward more northerly, till about the parallel of 25°, when it trends N. by E. and then N.N.E. to the entrance of the Persian Gulf. The coast has in most parts regular soundings close to the shore, and is clear of dangers; it is low near the sea, with many villages and date groves scattered along it, several having forts, exclusive of those specified. The country is hilly inland. General direction of the coast.

RAS KHOREFACAWN, or KURFAKEN, in lat. 25° 20′ N., lon. 56° 26′ E., is a rocky headland, on the N.W. side of which lies the cove and village of the same name, in lat. 25° 21′ N., only fit for small vessels, but affording good water. Ras Khorefacawn.

RAS DIBBAH, in lat. 25° 36′ N., is 5 leagues North of Khorefacawn, having a small islet on its north side, and a white patch a mile to the westward. The coast between this cape and Ras Huffar forms a large bay, in which the soundings are regular, varying from 5 to 16 fathoms. The town of Dibbah is at the head of the bay, about 5 miles W.N.W. of the cape. Ras Dibbah.

RAS HUFFAR, in lat. 25° 43′ N., distant 8 miles N. by W. of Ras Dibbah, has an arm of the sea called Dooat Huffar on its western side, extending 2 miles inland in a northerly direction, with depths of 8 to 3 fathoms, which seems to offer shelter from all winds excepting those that blow from the South. Ras Sooate is a small projecting point about 1½ miles S.S.W. of Ras Huffar. Ras Huffar.

RAS LIMA, in lat. 25° 55′ N., lon. 56° 32′ E., is a narrow peninsula, with an islet near it, projecting about 2½ miles nearly East from the town of Lima situated at the head of the bay, on the north side of the cape, where, it is said, wood and fresh water may be obtained. Variation 3° West in 1828. Ras Lima.

To the S.W. of Ras Lima lies the bay of Lima Cadeinah, extending 2 miles inland, with depths from 16 to 10 fathoms, open to easterly winds; and mid-way between Ras Huffar and Ras Lima, lies Dooat Sheriat, another bay, with from 14 to 4 fathoms water, and several other smaller inlets between Dooat Sheriat and Ras Huffar, all open to south-east winds.

DOOAT CUBBAL, about 6 miles North from Ras Lima, is a large inlet of the sea, with depths from 26 to 13 fathoms, open to easterly winds. Dooat Cubbal.

Roobat Guzzerah, or Malcolm Inlet. ROOBAT GUZZERAH, or MALCOLM INLET, is 5 miles North of Dooat Cubbal, and is very extensive; it has depths of water from 30 fathoms in the centre to 16 and 10 near its shores, which are much indented, forming coves and harbours all round the inlet. These coves, running directly inland on all sides, afford shelter from all winds, and are frequented by a few poor fishermen who inhabit their shores. RAS SERCAN is the headland which separates this inlet from Dooat Cubbal, the extreme point of which is in lat. 26° 5′ N.

Ras Dallaa. RAS DALLAA, in lat. 26° 7½′ N., is a narrow and remarkable peninsula, extending south-easterly 5 miles from the main land, forming the northern entrance point of Roobat Guzzerah, separating it from Dooat Rathrat.

Dooat Rathrat. DOOAT RATHRAT, or BRADFORD COVE, is about a mile across at its entrance, widening North and South inside. Its general depths are from 30 to 20 fathoms, and it apparently affords shelter from all winds in the northern part of the cove off some huts. About 4 miles off the entrance of Dooat Rathrat, is Omal Pherrim, or Fillam Rock.

Fillam Rock. FILLAM ROCK, or ISLET, is in lat. 26° 10′ N., distant 3 or 4 miles from the land, having 40 fathoms water between it and the shore; it is called Omal Pherrim by the Arabs.

DOOAT SHEESAH, or COMBERMERE COVE, 4 miles North of Dooat Rathrat, is similar in character to those just described, having indented shores and deep water. There are two islets on its northern side, and a rock off Ras Kasah, its southern entrance point.

Ras Goberhindee. RAS GOBERHINDEE (Cape of the Indian's Grave), in lat. 26° 22′ N., is the N.E. point of the peninsula which terminates the mountainous promontory of Ras-el-Jibbel, and off which lies the island of Moosendom, the well-known entrance point of the Persian Gulf. Ras Goberhindee is from 150 to 180 feet high. In some charts we find the name applied improperly, we believe, to the S.E. point of the peninsula, 4 miles South of the one above described.

On this part of the coast, and from hence to Cape Mussendom, the water is generally deep, there being 40 or 50 fathoms in many places within 2 or 3 miles of the shore.

# PERSIAN GULF.

## PRINCIPALLY FROM THE SURVEY AND DIRECTIONS OF CAPTAIN BRUCKS, OF THE BOMBAY MARINE.

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### ARABIAN SIDE.

RAS MOOSENDOM, in lat. 26° 24′ N., lon. 56° 35′ E., is the North extreme of the island of Moosendom, a barren rock, about 2 miles in length and 1 in width, surrounded by steep cliffs. The cape point is not more than 30 feet high, but the cliffs increase in height towards the south extreme of the island, where they are from 100 to 150 feet; but the highest part is a peak of between 400 and 500 feet elevation, from whence to the shores of the island there are ridges of broken rocks. Ras Moosendom.

Half a mile N.N.E. of the cape is a high inaccessible rock, named Kuchul by the Arabs, with soundings close to it of 90 to 100 fathoms; round Moosendom Island, within a few yards of the cliffs, the depths are from 40 to 60 fathoms, rocky ground. There is a narrow channel between Moosendom and the main, with from 20 to 40 fathoms in it. The tide here rises about 8 feet. Tides.

The name of Cape Moosendom is seldom restricted to the point above described, but is applied generally to the promontory which forms the north-eastern limit of the Arabian territory, and the S.W. entrance-point of the Persian Gulf.

THE QUOINS are three small islets or rocks to the northward of Ras Moosendom, so named by Europeans from two of them being formed like a wedge or quoin; the Arabs call the Great Quoin, Benatha, or Mamma Salama, and the Little Quoin, Ben Salama, Salama signifying Salutation or Welcome, and Mamma, and Ben, their relative size. The Great Quoin is in lat. 26° 30′ N., lon. 56° 34′ E., bearing from Cape Moosendom N. ¼ W. distant 6¾ miles; it is between 200 and 300 feet high, with its steep side facing the N.W. The Little Quoin bears from the Great Quoin S.E. ¾ S. distant nearly 2 miles; and Gap Islet, the smallest of the three, bears from the Great Quoin E.S.E., distant nearly one mile. They have 45 fathoms water close to, with safe passages between them, but these being narrow, with irregular currents, large ships ought not to pass between the Quoins, except in case of necessity. Between the Little Quoin and the cape, there are from 70 to 100 fathoms, over rocks; and on this coast where the high land fronts the sea, the soundings increase from the opposite or Persian Coast, where they are comparatively shoal. Betwixt the Quoins and the cape, the currents are very rapid during the springs, running from 3 to 4 miles an hour, and taking nearly the direction of the coast. The strong current that runs through the narrow channel between Moosendom and the main, when opposed by the wind, raises so heavy a surf as to render the passage very perilous. From hence, the land forms a curve to the southward and westward to Ras-el-Bab, the Door, or Gate Cape, the two extremes being 1½ miles from each other, with from 30 to 40 fathoms water, over sand and rocks, close to the shore. Ras-el-Bab is a remarkable promon- Quoins. Great Quoin. Currents. Ras-el-Bab.

tory, consisting of Basaltic rocks, high and precipitous, and it forms one point of a deep bay, about 3 miles in depth, and 1 in breadth at the entrance, round which the land is extremely high, rugged, and barren. The soundings in the bay are from 30 to 40 fathoms close to the rocks, over a bottom composed of sand and rocks; this bay should not be entered unless in a case of necessity, for the winds are always baffling, and the anchorage bad. On its north side, and only a few yards from Ras-el-Bab, is a high perpendicular rock, close to which there is deep water, and which, until closely approached, appears as part of the cape. From the western point of the bay, the land trends, with two or three small indentures, to the W.N. Westward, about 2½ miles to Coomza, having deep water close to the shore, which is mostly formed into cliffs, at the foot of high rugged hills.

Coomza. COOMZA, bearing from the Great Quoin S.W. by S., is a village containing about 300 inhabitants, subject to the Imaum of Muscat, situated at the bottom of a narrow cove about 1½ miles deep, with from 20 to 10 fathoms water in it, over sand and rocks. The inhabitants of this village seemed to be very poor, subsisting chiefly by fishing, excepting some families of Bedouins, who live on the produce of their goats, which feed on the thorny shrubs and the milk bush, found growing in small quantities in the fissures of the rocks among the hills.

Goon Island. From the Great Quoin S.S.W., distant a little more than 8 miles, and about 3 miles N. Eastward from Coomza, lies Jezeerat Goon, a high rugged island about a mile long, and 3 quarters of a mile broad, formed around by steep cliffs, having on its S.E. end, a point resembling a steeple. At its western and northern sides, the depths are from 40 to 60 fathoms within a third of a mile of the rocks, with 30 to 35 fathoms at the same distance from its southern and eastern sides.

Abooraschid. ABOORASCHID ISLAND, bearing from the Great Quoin S.W. ½ S., distant 9 miles, and nearly due North from Coomza village 2½ miles, is a mile long, and a third of a mile in breadth, with steep cliffs all round, and a high conical hill on its southern extremity, where it is not more than a third of a mile distant from the main. In mid-channel stands a high precipitous rock, called Bab Macaliff, on one side of which the summit overhangs the base in a remarkable manner. The depths in the channel are 35 fathoms, rocks and sand; and as the currents run through it in eddies, with baffling winds, the passage ought not to be attempted. At less than a mile to the northward of Abooraschid, lie some rocks elevated about 15 feet above water, round which the currents run with great rapidity, rendering the navigation near them extremely dangerous. These rocks being white with the dung of birds, may be seen at a considerable distance in the day-time: they have from 18 to 25 fathoms water close to them, with 20 fathoms between them and the island.

Currents in the channels.

Lump Island. LUMP ISLAND, called Towkhul by the Arabs, bearing E. by N. 4 or 5 miles from the rocks last mentioned, from the Great Quoin S. ¼ W. distant nearly 6 miles, and from Cape Moosendom W.N.W. ½ W., is elevated about 400 feet, with high cliffs; and round it the depths are from 40 to 50 fathoms, with from 50 to 60 fathoms over rocks, between it and Abooraschid.

Perforated Rock. PERFORATED ROCK, in lat. 26° 24′ N., lon. 56° 28′ E., bearing West a little Northerly about 2 miles distant from the north point of Abooraschid, and from the Great Quoin S.W. ½ W., distant 9 miles, is about 40 feet high, not more than a few

yards long and narrow, with a perforation through its centre. Between it and Abooraschid there are three small coves, each about a mile deep, with from 18 to 20 fathoms water in them, over rocks and sand, and from 25 to 30 fathoms off their entrances. The central cove has some very remarkable basaltic rocks at its extremity, and the hills are generally from 800 to 1,200 feet high, with steep acclivities, and one of the highest exhibits the basalt in the form of mountain caps. In the western cove a vessel might lie nearly land-locked, secure from all winds; but the others are more open, although the easternmost one, at its extremity, has a small basin, where a vessel might haul in to repair, in 3 or 4 fathoms water: this basin is formed by a turn in a part of the land, and perfectly secure, but the rest of the cove is open. Coves.

GUNNUM ISLAND, distant about 2 miles S. Westward of Perforated Rock, is nearly 4 miles in extent North and South, and about a mile broad at the widest part. There is a natural jetty of rock about 40 feet high at the north end of the island, projecting transversely to its length, and thereby contracting the width of the strait between the island and the main in that part to less than half a mile, but defending the entrance from the heavy sea during the northerly winds. The island is very rugged, increasing in height towards the southern extremity, near which stands a high conical hill, elevated between 600 and 700 feet above the sea: many goats and some ruined huts were seen on the hills, and on a small beach at the southern point of the island were a few families of fishermen. Gunnum Island.

The strait, called Discovery Strait, formed between the island and the main, is from half a mile to a mile wide, affording good shelter in 15 fathoms water, under the jetty or pier at its north end, with the Great Quoin seen over a small sandy beach, which separates the westernmost cove, before described, from the strait. In anchoring here, care must be taken to avoid a coral reef projecting from the pier, which has 10 fathoms water close to it; but there is no other danger in the channel. The depths are from 17 to 19 fathoms, and off the entrance from 30 to 25 fathoms, rocks and sand. The strong currents which run through this passage require caution, and on the flood, if passing from the eastward to enter the strait, Perforated Rock must be kept close a-board, or the tide will otherwise carry the vessel into a deep bay to the westward of Gunnum Island. At the southern end, the strait forms a small bay, with from 30 to 15 fathoms water: on the eastern side of which, in a valley, lies the village of Ghurrum, inhabited by Bedouins, who are under the Sheik of Coomza. A small date plantation was seen here having in it two or three wells of water a little brackish, and over the date grove the mountains are very high and rugged. On the southern side of the bay, in a small cove, stands the village of Khubbai, containing about fifty poor fishermen, subject to the Sheik of Cassaab. Discovery Strait. Anchoring. Ghurrum. Khubbai.

About $1\frac{1}{2}$ miles S. by W. $\frac{1}{2}$ W. from Gunnum Island, there is a remarkable cliff upwards of 200 feet high, surmounted by a hill forming a truncated cone, the summit of which is about 900 feet above the sea. Its southern and western acclivities are less abrupt. Close to the rocks, there is 13 fathoms water, and 37 fathoms about a mile off shore.

COLVILLE COVE, is about 4 miles deep and generally a mile wide, and the northern point of its entrance is a high rock like a steeple, situated about a mile to the southward of the cliff last mentioned, and bearing from Ras Sheik Munsoud, E.N.E., distant nearly 6 miles. At the entrance, both sides of the cove are formed of cliffs from 100 to 150 feet in height, but the northern point is the most remarkable, by being Colville Cove.

perpendicular, with large masses of rock constantly breaking away, and falling at its base; and the rocks are excavated to a considerable depth by the action of the sea. Rhoob Alli. The village of Rhoob Alli stands at the extremity of the cove, within a sandy beach, which has a small square mosque, with neatly constructed houses of rough stones, and thatched with the leaves of the date palm. A few date trees and fig trees were growing amongst the houses, with some of the Acacia kind near the mosque: this village contains some wells of good water. The cove stretches nearly N.W. and S.E., having from 25 fathoms water at the entrance, to 9 fathoms within the sixth of a mile from the beach, over a bottom of rocks and sand: it is much exposed to N.W. winds, at which time the sea is high, and breaks furiously against the rocks.

From Colville Cove the coast extends South a little westerly 4 miles to the entrance of Elphinstone Inlet; it is formed of steep cliffs and is somewhat indented; there are from 25 to 18 fathoms close to the rocks.

Elphinstone Inlet. ELPHINSTONE INLET, the name given to this arm of the sea by Lieutenant Guy, is about 9 miles in length, stretching in various undulations to the back of Colville Cove, and exhibiting several very romantic aspects, the hills which form it being from 800 to 1,500 feet high, very rugged at the summit, and mostly precipitous. As numerous bays indent the inlet in various directions, its width is thereby very unequal, but the narrowest part is about a third of a mile broad. The western point of the entrance bears S.S.W. $\frac{1}{4}$ W. from the north point of Colville Cove, distant nearly 5 miles, and from Ras Sheik Munsoud W.S.W., distant 4 miles: about a third of a mile from this western point of the entrance lies a $4\frac{1}{2}$ fathoms Rocky Bank, having close around it 9 and 10 fathoms. The entrance being only about half a mile broad, bounded with high dark-coloured rocks, is scarcely discernible until closely approached, when a small islet like a building is seen, with the cliff, of a lighter colour than the circumjacent rocks, and having steep sides; this islet is nearly 100 feet high, having close to it 16 fathoms. To the right of this islet, which forms one point of it, there is a cove about a mile in length, having from 12 fathoms at the entrance, gradually decreasing to 3 fathoms near a small sandy beach, overhung by high mountains, where Fernacah. stands the small village of Fernacah, containing only a few fishermen.

To the southward of the above-mentioned islet $1\frac{1}{2}$ miles distant, in a small bay, Nareefee. stands the village of Nareefee, containing about 50 houses, the inhabitants of which are fishermen, subject, with the others near this place, to the Sheik of Cassaab, a dependent of the Imaum of Muscat. The water is bad, and the place destitute of cultivation. This village is situated on the western side of one of the numerous branches of the inlet, which to the eastward of the beach forms a basin, having from 12 to 2 fathoms sandy bottom, where a vessel might be hauled up to repair with perfect security.

Khannai village. Close round the eastern point of this bay, Khannai village is situated at the foot of abrupt mountains, in a small bight, at each point of which the shore consists of high and broken cliffs: this village is the next in size to Nareefee, and contains about 150 fishermen, whose appearance denoted less of poverty than those in most of the places hereabout. A considerable quantity of poultry was seen, with one or two bullocks, and many goats, but these are fed on the refuse of fish.

From the eastern point of Nareefee, North, a third of a mile, stands a high bluff head, from whence the inlet turns generally to the N.E. and East, for the remaining part of its length. To the N.E. 2 miles from the above point, or head, on the sandy Shem village. beach of a small bay, Shem village is situated, which consists of a few houses inhabited

by fishermen. A remarkably abrupt mountain rises from the beach nearly 800 feet in height.

Opposite to Shem, distant about a mile, is situated an island called Jezeerat Shem by the Arabs, about two-thirds of a mile in circuit, of conical figure, the northern side very steep, the southern less so. About a third of a mile to the S.W. of the island there is a high rock, having 15 fathoms close to it, and from this rock the land forms a bay of about a mile in depth, having from 17 to 13 fathoms water, over sand and rocks. On the southern side the island rises into high broken mountains, the highest of which, in a back range, is between 2,000 and 2,500 feet. Jezeerat Shem.

Between 1 and 2 miles N.E. of Shem village, is a remarkable wall of rock, from 50 feet near the point, to 200 feet high, where it meets the hills, contracting the cove to about two-thirds of a mile in width, and it has 16 fathoms water close to. About a mile N.Eastward from the point of this, there is an island called Jezeerat Sabee, 50 feet high, a third of a mile in length, and about half that breadth; which is connected with a point on the northern shore only a few yards from it by a reef of rocks mixed with coarse coral. About a mile N.N.W. from the last-mentioned islet, in a narrow cove, is the village of Meddai, consisting of only a few scattered houses, containing not more than 20 inhabitants. At the back of the village, the hills rise about half a mile from the beach with gentle ascents, and covered with coarse round gravel, excepting in one part about 50 square yards, which contained a few esculent vegetables, and near a well of good water, three date trees, affording the only signs of cultivation in the inlet. There were several wells near this spot, which must have been excavated with great labour. A narrow ridge of hills between 400 and 500 feet in height, divides the inlet here from Colville Cove. Jezeerat Sabee. Meddai village.

Sabee village, containing about 20 houses, is the last place to be described in the inlet; it bears from Sabee Islet about E. by S. $\frac{1}{2}$ S., distant $1\frac{1}{2}$ miles, and is situated on a beach of shingle, at the foot of some high steep hills. A rugged path on the side of a ravine leads to the summit of a ridge, apparently between 700 and 800 feet high, from whence, contrary to expectation, the eastern coast was observed to be only a mile distant, formed into numerous indentures and islands, like the coasts of Elphinstone Inlet. Sabee village.

Elphinstone Inlet from being narrow at the entrance is not likely to be resorted to by shipping; besides, the currents run very strong off it on the springs, and the height of the mountains surrounding it excludes every regular breeze, allowing only light baffling airs to enter. There can be little doubt, however, of it having afforded shelter to the piratical boats when chased by our vessels of war; for until the survey was made by Lieutenant Guy, this inlet was not known to exist, and many of these boats disappeared from view hereabout, our commanders hesitating to follow them into places supposed to be dangerous: on this account, a minute examination was deemed of some importance. The soundings are generally from 17 to 19 fathoms throughout the inlet, hard ground, chiefly sand and rocks; and it contains no dangers. Great quantities of Seir fish, and a large sort of mullet, between 2 and 3 feet long, are caught here.

Seeful Ghurrib, a small village, containing eight or ten houses, is situated upon a sandy beach, in a bight close round the western point of the inlet, having 8 fathoms water, within a very short distance of the shore. Seeful Ghurrib.

CASSAAB FORT, in lat. 26° 13′ 10″ N., bearing from the eastern point of Ras Sheik Munsoud S.S.E. $\frac{1}{2}$ E., distant 3 miles, is situated in a small sandy bay, about 2 miles to the westward of Elphinstone Inlet. The hills near it are very high and rugged in some Cassaab Fort.

places, and the two extreme points of the bay are high and craggy, overhanging the sea: on the western one stands a square stone building, probably intended as a look-out house. The fort is a quadrangular building of stone, with square bastions, and seems to be strong, although apparently ancient, but there are no guns mounted. In the centre stands the Sheik's house, a miserable mud hovel, amongst three or four others. Nearly equidistant on each side of the fort, stand two round towers, much out of repair, and without guns: these are insulated at high water, and flank a date grove, containing rather more than a square mile of plantation, with huts and several fortified houses scattered about. There is no regular town, but about 500 persons might be assembled from the date grove. The Sheik is under the Imaum of Muscat, and his various dependencies, including a Bedouin town on one of the hills, are said to contain about 5,000 persons of all ages. In this valley, was unexpectedly found a grove of large date trees thickly planted, and at the back of the date grove, about a square mile of ground laid out in fields of wheat and barley, with gardens containing onions, a sort of turnips, &c. There were many wells of good water, from which the plantation was irrigated by small aqueducts, in the manner used in India. The landing is unpleasant owing to the beach forming a very extensive flat, dry about a quarter of a mile out, at low water: the rise of the tide is 8 feet.

Produce.

Tides.

Close round the west point of the small sandy bay of Cassaab, in a deep cove, the village of Cuddai is situated, having a small date grove defended by a tower, but containing very few inhabitants; the cove is half a mile wide, with regular soundings from 8 to 3 fathoms sandy bottom. On the west side of the entrance to this cove, stands the village of Mokhai, containing upwards of sixty houses, and between 300 and 400 inhabitants, who are fishermen. Here are some wells of pretty good water; the large tabular masses of rock, which rise from the beach to about 100 feet of elevation, forming broad terraces on which the houses are built, give it a singular appearance.

Cuddai.

Mokhai.

Ras Sheik Munsoud.

RAS SHEIK MUNSOUD, in lat. 26° 16′ N., lon. 56° 19′ E., bears from Mokhai North about 3 miles distant, the coast between them having one or two small indentures, in one of which, about mid-way, lies the small village Hennai, having not more than eight or ten houses, with a date grove behind them. Over this village, on the summit of a hill elevated between 600 and 700 feet above the sea, stands the Bedouin town of Alarf, subject to the Sheik of Cassaab, consisting of only rude loose stone huts surrounded by a stone wall, but contains between 700 and 800 inhabitants. From Ras Sheik Munsoud, the Great Quoin is seen nearly in a line with Perforated Rock, bearing N.E., distant 20 miles; and the N.W. point of Gunnum Island, on the same bearing, distant 9 miles. Between this cape and Cassaab the soundings are from 17 to 22 fathoms within a quarter of a mile of the shore, over a bottom of rocks and sand, becoming entirely sand within 2 miles of the fort.

Hennai.

Alarf.

The Cape is the S.W. point of a large bay, formed between it and Perforated Rock, in which are the coves above described: the extremity of the cape is about 40 feet high, with the cliffs sloping inward from the summit to the base, from which large masses are constantly falling, and thereby rendering the shore very rocky to about one-sixth of a mile from them. From hence the land mostly rises with a regular slope to the mountains over Cassaab; and in a small sandy bight on the west side of the cape, there is a tomb containing the body of the Sheik from whence the cape has derived its name. The tide rises here 7 and 8 feet.

Tides.

In passing the large bay between the cape and Perforated Rock, care is required

to prevent being carried into it by the tides, either of ebb or flood, especially if the wind be light, for the stream being very strong on the springs, in meeting the opposite point, is deflected by it, and a vessel is liable to be carried back to the centre of the bay. The soundings are usually from 22 to 30 fathoms, deepening to 40 and 50 fathoms as Perforated Rock is approached. On the west side of Gunnum Island, the soundings are from 40 to 50 fathoms within a mile of the shore. From Ras Sheik Munsoud, the coast stretches usually in a S.W. direction, fronted by steep broken cliffs; the soundings are regular in this part, 18 fathoms near the rocks, 40 fathoms within a mile, and 50 to 60 fathoms about 3 miles off shore, over a bottom of rocks and sand.

RAS JEDDEE, or YEDDEE, in lat. 26° 14′ N., lon. 56° 16′ E., bearing from Ras Sheik Munsoud S.W., distant 3½ miles, is a high bluff point, not conspicuous unless near to the shore, having 18 fathoms water close to. Aljeeree village is 1½ miles to the southward of the point, containing few inhabitants, with a small date grove between the beach and the hills. From this place a beach commences, extending as far as Bokha; and 1½ miles southward of Aljeeree, in front of a small date grove, lies the fishing village of Jeddee, containing about 100 persons. Some wells of good water, easy of access, are situated at a small distance from the beach. About a mile farther South, lies the town of Bokha, in a small sandy bay which is open to the northward. There is a square fort much out of repair, with guns mostly dismounted, and having around it, about 150 houses, containing between 500 and 600 persons, chiefly fishermen. The Sheik, a dependent on the Imaum of Muscat, has under his jurisdiction between 1,200 and 1,500 persons of all ages. Besides the fort in the town, there is one that appears their principal defence, situated on the western point of the small bay; it is a square building, with a high tower at one of the angles, in better repair than the former. *Ras Jeddee.* *Jeddee village.* *Bokha.*

Bokha Point, is in lat. 26° 9′ N., lon. 56° 14′ E., bearing from Ras Jeddee S.W. by S., distant 5¼ miles. To the eastward of the town, half a mile, there is another square building on a hillock, completely commanding the town, and intended for matchlock defence, having a platform and breastwork, with loop-holes. There is behind the town a plain, about 2 square miles in extent, partially cultivated with a few young date trees, in small plantations. Not long ago, a date grove extended from hence nearly to Jeddee, but the pirates destroyed it, and thereby deprived the inhabitants of their principal article of food; since the reduction of Ras-el-Khyma, they have again commenced planting. The place, however, seemed to be in a state of poverty, few cattle or poultry being visible. The soundings gradually deepen from the beach to 7 fathoms at 1¼ miles distant, then suddenly to 10, 19, and 25; and at 2 miles' distance, to 40 fathoms, sand and rocks. *Bokha Point.*

Shaum Point bears from Bokha Point S.S.W. ½ W., distant 7 miles; the land in this space is high, with three small indentures, having sandy beaches, and deep water close to them, in which are an equal number of villages, with a small plantation of date trees behind each of them: they are very small, and subject to Bokha. The depths are from 25 to 30 fathoms, 2 miles from the shore. A short distance North from the Towers of Shaum, there is a remarkable white mark or patch, very conspicuous when the sun shines in a particular direction, and being elevated, it is seen at a distance before the beach is discernible. This mark is on the face of a mountain which forms the point of Shaum, and which is about 800 feet high, with its southern side nearly perpendicular. *Shaum Point.*

Shaum. SHAUM FORT, in lat. 26° 2′ N., lon. 56° 11′ E., bears South about 2 miles from Shaum Point. Here begins the low sandy shore, which continues uninterrupted for several hundred miles along this side of the gulf. Shaum is a small district at the boundary of the territories belonging to the Imaum of Muscat, having a Sheik, under whom there may be from 600 to 700 persons, who live by fishing, and cultivating the small space of ground between the beach and the mountains. Near the beach, are the ruins of a fort, a mosque, and some huts, which have been partly destroyed by the pirates. The village where the inhabitants now live is on the side of the mountain, about 1½ miles from the beach; the houses are built of loose stones and mud, covered with the leaves of the date tree. The Sheik, and those under him, were very civil to the officers of the surveying vessels, and a constant supply was afforded of poultry, goats, milk, and butter, with a few vegetables, at a reasonable rate. Between the beach and the foot of the mountains, is a space from 1 to 1½ miles in breadth, and nearly 3 miles in length, cultivated with barley, onions, a sort of turnips, &c.; also, several small date plantations, with wells of good water in them, and the sea affords a variety, and a very plentiful supply of fish. Some camels were seen. A range of hills from 1,000 to 1,200 feet high, extends from hence nearly South to a little beyond Ras-el-Khyma, where it takes a S. Easterly direction, diverging entirely from the coast. About a mile from Shaum Fort, close to the beach, on a mound 50 feet high, stands a small mosque in ruins, thought to be very ancient, which was found to be an excellent mark in carrying on the survey of the coast. The beach is steep, having 3 fathoms close to it, 10 fathoms half a mile off, and 20 fathoms 3 miles off, regular soundings on a sandy bottom, without any danger. During North-westers, the sea beats over the beach with great fury, the surf rising before the breeze sets in, as the swell from the N.W. always precedes the wind. When this commences, no vessel ought to be at anchor on the coast, as the heavy sea will not allow her to ride in safety: this caution is necessary along the whole extent of the Arabian coast in the Persian Gulf, and farther up more indispensable. The tides or currents during the springs, run in the direction of the coast from 2 to 3 miles per hour, and rise from 6 to 8 feet. To the southward of Shaum, between 3 and 4 miles, there is a small creek, that will admit a little boat at high tide, but the entrance is dry at low water.

Supplies. Water. Mosque. North-westers. Tides.

Raumps. RAUMPS, in lat. 25° 53′ N., lon. 56° 8′ E., bearing from Shaum S.S.W., distant 10 miles, is situated on the southern side of the entrance to a small creek, capable of admitting large boats at high tide, but at low water the entrance is nearly dry. The town is in ruins, having few inhabitants, as the former population went to Zyah, and other places. The remaining village is situated near the hill of the same name, where stood the fort, which was destroyed during the expedition against the pirates. About 400 or 500 inhabitants are still left, who subsist chiefly by fishing, and having a few boats, they employ a small number of these on the pearl fishery at the proper season, but the return is very inconsiderable. Prior to the expedition, this place was rising fast into importance, under an independent Sheik, but it is now subject to Sharga. The inhabitants were greatly distressed in 1822, by the destruction of their trading boats, which forced many of them to emigrate. The soundings are 3 fathoms close to the beach, 10 fathoms about 1½ miles off, then gradually deepening to only 11 fathoms about 3 miles off shore, over a bottom of sand. The rise of tide is 7 feet.

Tides.

About 1½ miles southward from Raumps, there is a small creek communicating with Ras-el-Khyma, through the marshes, which extend nearly to the foot of the hill surrounding Raumps, and reaching to Zyah, but it is not navigable. Both on this side of

the gulf, and on the Persian shore, there are evident marks of the sea having formerly flowed above its present level, in many places.

RAS-EL-KHYMA, or RAS-UL-KHIMA, in lat. 25° 48′ N., lon. 56° 4′ E.,* as settled by the late trigonometrical survey of this coast, under the direction of Lieut. Guy, of the Bombay marine, bears from Raumps nearly S.S.W., distant 6 or 6½ miles. On this point, or narrow sandy spit, lie the ruins of the town, which, with the pirate vessels of this and several other villages, were partly destroyed in 1809, by a British force sent from Bombay for this purpose: and as the pirates resumed their depredations on all defenceless vessels trading to the Gulf, another force from Bombay, in 1819, completely demolished Ras-el-Khyma, which was the chief town of the Joasmee pirates. The point forms the western side of the entrance to a backwater, which extends 3 miles nearly parallel with the coast, and is 1½ miles in breadth near the centre; but the entrance is not more than one-sixth of a mile wide, with a bar of sand across, having only 2 feet water on it at low spring tides. The soundings inside, vary from 16 to 5 feet, very irregularly, and at low water the whole is nearly dry, except in a narrow stream in the centre; close off the ruins of the town, there is sufficient water to float a small vessel. Opposite the ruins, and within the backwater, are two or three small flat islets, and on one of them, named Maharah, is a village containing 50 or 60 huts, inhabited by fishermen. On the eastern side of the entrance to the creek, there is another village, named Meidthea, containing between 200 and 300 inhabitants of the Joasmee Tribe, where huts are merely made of Cadjan mats, although the ruins of the former town afford plenty of materials for building. About 1½ miles E.S.E. from the town, the date groves commence, but the trees appear aged and neglected: it is only here, that fresh water can be got. None of the buildings of the old town remain entire, nor any part of one, sufficient to indicate what might have been its form, with the exception of a few fragments of two round towers at its west end. The chief part of its former inhabitants have retired to town some distance within the date groves; a few occupy the villages named above, and others have emigrated to Sharga, and various other places on the coast. They are now completely subjected to the Sheik of Sharga, whose brother attended during the survey of the creek and backwater, to prevent any molestation from the inhabitants, who were civil. The former chief, Hassan Ben Rahma, is now Sheik under Ben Sugger, of a large village, named Khassual, situated in the date groves, about 6 miles from Ras-el-Khyma. Ras el-Khyma.

The soundings off the town deepen gradually from 1 to 4 fathoms, and are very regular, over a bottom of sand, with the exception of a sand-bank, having only 2 and 2½ fathoms on it, which bears from the Fort, W. by N., distant about 2¼ miles. This bank is said to extend several miles to the southward, having within it 4 fathoms; and from 4 fathoms outside, the soundings deepen gradually to 9 fathoms about 5 miles off shore. The anchorage is not good, the bottom being sand and shells, but the best berth is in 6 fathoms, with the point bearing S.E. The Minerva at anchor in 6½ fathoms loose sand, had the town of Ras-el-Khyma, bearing E.S.E., distant 4 miles, the town of Raumps N.E. by E., the town of Jezeerat Umrah S.S.W. ½ W., and the extremes of the land from Ras Jeddee N.E. by N. to S.W. by S. off the nearest shore 3 miles. At full and change of the moon, it is high water at 11 hours; the tide rises 7 feet, and runs regularly 6 hours each way. Variation 3° W. in 1820. Tides.

* Captain Sealy, of the Bombay Artillery, made it in lon. 56° 0′ E., and Mr. Campbell, of H. M. S. Liverpool, in 1819, made it the same.

Supplies.

Supplies of bullocks, fowls, butter, and vegetables, are procured at very reasonable rates, and as no want of these articles was experienced on any part of what is generally termed the Pirate Coast, the interior must be fruitful, although no coast is more sterile in appearance, the only signs of vegetation being the date groves, in which the trees are thinly scattered.

Jezeerat-ul-Umrah.

JEZEERAT-UL-UMRAH, or RED ISLAND TOWN, in lat. 25° 43′ N., lon. 56° 55′ E., bearing from Ras-el-Khyma W.S.W., distant nearly 11 miles, had been a place of some importance prior to its demolition during the expedition against the pirates. The coast between these places has a beach of sand, with soundings from 3½ fathoms at 2½ miles off, to 10 fathoms at 6 miles off it, very regular, over a bottom of sand. A range of hills of *red colour*, about a mile from the shore, stretches along this part of the coast, from which Ul-Umrah is named. It is situated at the central part of a backwater, about 2 miles deep, extending in a N.E. and S.W. direction, and bounded to sea-ward by a narrow spit of sand. There are only 2 and 3 feet water in the back-water at low tide, with several small sandy islets and banks off the entrance, which render it navigable only by small boats. The remains of the town are about a mile in circuit, having 2 round towers on the land face out of repair, those to sea-ward having been destroyed, and close to the water on the western side stands a mosque of considerable size, in a state of rapid decay. The inhabitants, who are chiefly fishermen of the Joasmee tribe, do not exceed between 200 and 300, and the Sheik is placed here by the Chief of Sharga. There are no date groves near the town, and the only drinkable water, which is brackish in the hot months, is procured from the high ground about 1½ miles from the town. The soundings off the creek are very regular over loose sand, from 2 fathoms close to the beach, to 4½ fathoms half a mile off; they then gradually deepen to 12 fathoms between 6 and 7 miles off shore. The rise of tide is 6 feet on the springs. His Majesty's frigate Chiffonne, at anchor in 3¾ fathoms loose ground, had the northern extreme of the land bearing N. E. ¼ N., Ras-el-Khyma N.E. by E. ½ E., point of the island E. by N. ¾ N., and the western extreme of the town S.E. by S., off shore less than half a mile.

Tides.

Amulgawein.

AMULGAWEIN, in lat. 25° 35′ N., lon. 55° 42′ E., bearing from Ul-Umrah S.W. by W. ½ W. distant 16 miles, is situated on the northern point of the entrance to one of the most extensive backwaters on this part of the coast. Between these places the coast is low and sandy, forming an irregular curve, and fronted by a dangerous coral reef, which projects from it 1½ miles in some places. The outer extreme of this reef bears from Ul-Umrah W. by S. ½ S., distant 11 miles, and from Amulgawein Town N.E., distant 5½ miles, having 4 fathoms water close to its edge along the whole extent, 8 fathoms at 1 mile distant, and 12 fathoms about 4 miles from it, sand and rocks. The entrance to the backwater is formed between the point on which the town stands, and a low sandy island to the westward of it; and a large bank of sand and rocks lies one-sixth of a mile off the point, which contracts the channel to a few yards, where the depth of water near the entrance is only 3 feet. Close to the east side of the island, the depth is from 5 to 8 fathoms, and the various channels have generally from 6 to 20 feet in them at low water; but the backwater at 3 miles from the entrance, has several islets in it covered with low brush-wood. The extent of the backwater to the southward is considerable, but at low tide there is very little water in this direction: close under the town, it branches off to the N.E., taking the direction of the coast about 7 or 8 miles, where it communicates with the sea, affording a channel for small boats. On

its banks, about $2\frac{1}{4}$ miles N. E. by E. from the town, there is a large quadrangular tower in ruins, having some straggling date trees around; which tower is the object first seen in passing from the northward.

The town of Amulgawein is deserted, but appears to have been a considerable place; and as most of the walls of the houses are entire, they only require a roof to make them again habitable. The island off the town, mentioned above, is connected with the coast by a narow sand bank, dry at low water, and in the centre of the island is a small town called Libini, inhabited by about 500 Arabs, dependent on the Sheik of Sharja. There are no fortifications near the town, the Sheik's house being the only place capable of offering resistance to an attack. The water is bad; and about a mile to the S. Westward of the island there is a small village near some wells, the water of which is also brackish during the hot weather. Libini. Water.

The soundings off the entrance of the back-water are from 2 fathoms close to the rocky bank, to 6 and 7 fathoms about a mile off shore. The best anchorage is to the southward of the entrance, with the Sheik's house, which is the highest building on the island, bearing about E. N. E. in 7 fathoms; the soundings are from 2 fathoms close to the beach, to 6 fathoms half a mile off, and 7 or 8 fathoms $1\frac{1}{2}$ miles off, sand and rocks. The rise of tide is 6 feet on the springs; high water at 11 hours 40 minutes. Tides.

The coast from Amulgawein to Debay being very foul and rocky, no ship should anchor near the shore, or she will be liable to lose her anchor. The surveying vessels in a few days lost three, by hooking the rocks.

AYMAUN, in lat. 25° 25′ N., lon. 55° 33′ E., bearing from Amulgawein S.W. $\frac{1}{4}$ S. distant 14 miles, is a small town, situated on the southern point of the entrance to one of the best back-waters on this coast. Between these places there are a few straggling date trees near the sea, and the coast is low, flat, and sandy, having about mid-way a village at the mouth of a very small creek. At low water there are 5 feet on the bar of the back-water, and within, the soundings are not deep, there being from 6 to 14 feet in a narrow channel off the northern side of the town. The entrance is about a quarter of a mile wide, and at high water the creek forms a kind of basin within the point; but at low tide there is only a narrow channel affording from 6 to 12 feet water. The town, although small, contains from 1,000 to 1,200 inhabitants, of the Nhaim tribe, who dwell in houses made of mud and cadjan, and the only building capable of offering resistance in case of attack is the residence of the Sheik, which was partially destroyed during the expedition against the pirates. The Sheik, Raschid ben Amed, considers himself independent, but he is too near a neighbour of the Sheik of Sharja to be altogether free from control. Aymaun.

The country is very sterile, and fresh water is procured from wells about 3 quarters of a mile to the S. Westward of the town, which being situated in the open desert, are often nearly filled with sand during a N.W. gale. The inhabitants depend for subsistence upon the pearl fishery, and during the season send 140 boats to the bank: the returns may be between 12,000 and 15,000 dollars annually. Water.

The anchorage off the town is bad, over a rocky bottom. Near the shore, there are 2 fathoms, and 5 fathoms water about a mile off, then the depths increase gradually to 8 fathoms at 3 miles distant: but just without the line of 3 fathoms, there lies a small bank with 2 fathoms on it, bearing N. N. E. distant 1 mile from the town. The tide rises 6 feet on the springs; high water at 11 hours 20 minutes. Anchorage. Tides.

Between Aymaun and Sharja, the coast forms nearly a transit line, and distant 1 mile

from the entrance of Sharja back-water, at the entrance of a small creek, is situated the little village of Fusht, containing very few inhabitants, and now a place of no importance.

Fusht.

Sharja and Abboo Heyle.

SHARJA, or SHARGA, Square Tower, in lat. 25° 22′ N., lon. 55° 29′ E., bears from Aymaun S.W., nearly $5\frac{1}{4}$ miles; the town stands on the eastern side of a very narrow and inconsiderable back-water, extending parallel with the coast, the entrance of which is about a mile to the northward of the town, having across it a bar of sand. The breadth varies from 60 to 100 fathoms, and it has not more than 2 or 3 feet water at low tide:—in length it is about 3 miles, uniting at Abboo Heyle with the back-water there. The western side is bounded by a narrow spit of sand, which is isolated; the southern end forming one side of the entrance to Abboo Heyle. On this spit, and directly West half a mile from the town, stands the small square tower, around which are many huts containing from 500 to 700 of the Suidan tribe, who formerly inhabited the village of Kawn, situated on the southern side of the entrance to Abboo Heyle, which village was destroyed by themselves, on the arrival of the last expedition, when they retired to Sharja for greater security.

Sharja is open and defenceless, the walls and towers having been destroyed during the expedition; and from the Sheik's house downward, these buildings have a mean appearance, and, like all Arab towns, the streets are very irregular. The population consists chiefly of from 1,700 to 2,000 Arabs, of the Joasmee tribe, but there are others of different descriptions, Sharja being the seat of commerce on this side the gulf; these, however, are seldom long resident, which makes it difficult to ascertain their number. During the time of the pearl fishery, the population is nearly doubled, by the influx of natives from the interior. Sultan ben Sugger, the present Sheik, since the fall of Ras-el-Khyma, has been generally acknowledged Imaum, or Chief of the Joasmee tribe; he seems to be crafty, but enterprising, and possesses a good countenance, rather dignified; he is urbane in his manners; certainly not like a Pirate chieftain. He is anxious to gain the good-will of the English, and only wants our acknowledgment of his being head of the different tribes on the coast, to become actually so. Sharja sends 300 boats to the pearl fishery, and each person embarking pays a dollar to the Sheik for permission to fish, which tribute amounts to between 2,000 and 3,000 dollars annually. The returns from the pearl fishery are here very considerable, the export of that article being yearly between 80,000 and 90,000 dollars. The country for a considerable distance inland is sterile and sandy, affording no sign of cultivation, the date trees seeming to be in a wild state, and producing only a scanty supply of food; they depend on Bahrein and Basrah for this necessary article of subsistence, but the sea abounds with fish of various kinds. Fresh water is procured from wells half a mile East of the Sheik's house. To the southward of the town there is a hillock, of round form, higher than the adjacent ground, which with the small tower in the Suidan village are the objects first discernible from sea-ward, but the hillock is not very conspicuous.

Anchorage.

Although the shore may be approached within two cables' lengths by a frigate, the anchorage is nevertheless bad, as the bottom consists mostly of sharp coral patches: a heavy swell sets in, even with a moderate breeze from N.W., which renders it imprudent to anchor too close in, except in a case of necessity, and the north-westers seldom give sufficient warning of their approach. The soundings, from 2 and 3 fathoms near the beach, are regular to 6 at 1 mile, and 10 fathoms at 4 miles off shore.

Tides.

The tide rises 6 feet on the springs; high water at 1 hour.

Abboo Heyle is a small village about 3 miles to the S. Westward of Sharja, and Kawn Village, on the northern side of Abboo Heyle entrance, has been already mentioned.

DEBAI, in lat. 25° 16′ N., lon. 55° 25′ W., bearing from Sharja S.W. ½ S., distant 7½ miles, stands about 20 feet above the sea, on the southern side of the entrance to a small creek, having in it from 10 to 27 feet water near the town, but the entrance has only 2 feet water at low tide. There are several small banks off it, and the coast is fronted by a long reef to the distance of from half to 3 quarters of a mile, which extends N. Eastward nearly to the entrance of Abboo Heyle. From 1½ fathoms close to the banks, the soundings increase regularly to 6 fathoms 1 mile off, and at 3 miles off, vary from 6 to 8 fathoms over rocks and sand. The rise of tide is 7 feet on the springs. The town consists of mud hovels, circumscribed by a low mud wall, having several breaches, and defended by three round towers, and a square castellated building with a tower at one angle, much dilapidated, in which are three or four old rusty guns. The western tower, situated on a small cliff over the creek, is in moderate repair, with three or four guns mounted. The inhabitants are of the Beni Yas tribe, amounting to between 1,000 and 1,200, and the Sheik is subject to the Imaum of Muscat, who keeps 150 negroes here as soldiers to guard the town. The inhabitants collect shark fins, and send about 90 boats to the pearl fishery, which is their chief support, the yearly returns amounting to between 20,000 and 30,000 dollars. *Debai.* *Tides.*

The only fresh water wells in the place are at the back of the town, in two or three mall date groves; the country otherwise is very barren. *Wells.*

From the tower, the creek was seen to stretch in undulations 5 or 6 miles to the south-eastward, where it was lost in a marsh, and its banks were studded with small brush-wood, which answers for fuel. Dates are procured from Bahrein, and a small quantity of rice from Muscat.

Mid-way between Abboo Heyle and Debai, there is a small village of fishermen, inhabiting about twenty huts; and two other small places, 1½ miles to the southward of Debai, not deserving of particular notice.

Debai may be considered the termination of the Pirate Coast, as the natives to the S. Westward have been generally less addicted to predatory habits, and inclined to be friendly to the English, perhaps through fear.

From Debai to Abothubbee the coast stretches in a S. Westerly direction about 13 leagues, and is safe to approach by the soundings, which are generally regular, over a sandy bottom, mixed with rocks in some places; and the depths are from 4½ to 5½ or 6 fathoms, from 3 to 6 miles off shore. The land in this space is mostly low and flat, ornamented with date trees; but in lat. 25° 2′ N., lon. 55° 14′ E., Jibbel Alli is situated, about 3 miles from the shore. Between this mount and Abothubbee are the following places: Ras Hassun, in lat. 24° 53′ N., about 5½ leagues from Jibbel Alli; Ras Guntoor, 7½ leagues from it; Gonada about 4 miles farther; Gorabee, in lat. 24° 46′ N., about 3 miles from Gonada; Ras Ellora, in lat. 24° 41′ N., about 5 leagues to the N. Eastward of Abothubbee; Marafjain, 4 miles nearer to the latter; Ras-ul-Grab within 10 miles of it; and Luffan, about 3¼ leagues from Abothubbee. *Coast from Debai to Abothubbee.* *Jibbel Alli.* *Other places.*

ABOTHUBBEE, in lat. 24° 29′ N., lon. 54° 32′ E., is a town with a small fort, and about 1½ miles to the S.S.W. of it there is a village and tower. A ship may anchor at Abothubbee, with the fort from East to E.S.E., in 3 fathoms about a mile off, or in 4 fathoms about 1½ or 1¾ miles off shore; but a shoal projects in a N.W. *Abothubbee.*

direction $1\frac{1}{2}$ miles from Abothubbee, and stretches in a N.E. direction about 3 miles, at the same distance from the shore.

East India Company's Islands.

At a few miles' distance to the southward of Abothubbee, the coast changes from a south-westerly to a westerly direction, and is fronted by a chain of islands, called by Lieutenant Guy EAST INDIA COMPANY'S ISLANDS, but each of them has a native name. This chain of islands extends parallel with the coast in an East and West direction, from the meridian of 54° 30′ E. near Abothubbee, to that of 52° 44′ near the point called Jibbel Hadwareah. The name of East India Company's Islands appears by the chart to be restricted to the middle group of the chain comprehended between the meridians of 54° 10′ E. and 53° 10′ E., which group is surrounded by an unbroken line of coral reefs. The other islands, both to the eastward and westward, are also surrounded by reefs, but they are less united, having channels between them. Between the island reefs and the reef which lines the coast, there is a spacious inlet or channel, called KORE-EL-BEZZIM, with soundings of 3 to 7 or 8 fathoms; the only safe entrance into it is in lon. 53° 8′ E. 4 miles to the westward of Bezzum-el-Gurrubbee. Some of the low islands which form this chain are 8 or 9 leagues distant from the main land, and the reefs in some places are more distant. Off the N.W. part of the large bank which surrounds the East India Company's Islands, and only separated from it by a narrow channel, are two dry sand banks. The north-eastern one, called WALKER REEF, is 15 miles long and 6 broad; the other, about 11 miles long and 3 broad. Outside of these is Stannus Shoal, a channel of 3 or 4 miles wide intervening.

Stannus Shoal.

STANNUS SHOAL has many dry banks on it, and extends from lat. 24° 31′ N., to lat. 24° 40′ N., and from lon. 53° 8′ E., to lon. 53° 17′ E., the north end of it being $4\frac{1}{2}$ leagues due South from the South point of Zircooa Island: between them, the soundings are from 5 to 8 fathoms. To the S. Westward of Stannus Shoal, the depths are from 6 to 10 fathoms towards the entrance into Kore-el-Bezzim, or to the distance of 4 leagues in the direction of Seir Beni Yas; but from the latter island in a N.E. and easterly direction, to the distance of 3 and 4 leagues, there are many shoal spots and several dry sand banks.

Seir Beni Yas.

SEIR BENI YAS (the north point), in lat. 24° 21′ N., lon. 52° 47′ E., situated to the eastward of Dalmy, has two peaked hills, in the centre of the island. It is about 7 miles in extent North and South, and 5 or $5\frac{1}{2}$ miles in breadth, its N. Western extremity terminating in a low sandy point. It is bounded on its northern and eastern side by a shoal bank extending between one and two miles from the shore. The south point of the island is distant about 5 miles from the main land, leaving a narrow shoal channel, navigable only by small pearl boats. The S.E. point of the island curves round to the westward, forming a safe land-locked harbour within it, for small vessels, with 5 and 6 fathoms water, and from 3 to 4 fathoms at the entrance, or in the channel leading to it, which is close along the narrow point, as a shoal projects from the southernmost part of the island to the eastward, across the entrance of the channel, rendering a close approach to the S.E. point, or starboard side, necessary in proceeding around it towards the harbour. The channel between Arzenie and Seir Beni Yas is safe, with irregular depths from 8 to 19 fathoms. From hence, the whole coast to the westward is very low, and several small islands lie off it, considered dangerous to approach.

Jibbel Hadwareah, and Ras-el-Machereeb.

JIBBEL HADWAREAH, in lat. 24° 12′ N., lon. 52° 47′ E., is a point of land about 4 miles South from the S.E. point of Seir Beni Yas, and from hence to RAS-

EL-MACHEREEB, in lat. 24° 17′ N., lon. 51° 45′ E., the coast between these headlands, which is generally low, forms a bight, receding to lat. 23° 58′ N., and is fronted by a shoal bank of foul ground, projecting 6 or 7 miles in some places, and at other parts only 1 or 2 miles. About 10½ miles from the coast, and 5 leagues W. by S. from the south point of Seir Beni Yas, lies a 2-fathoms bank, having 7 and 8 fathoms water around, and between it and the shore.

PSYCHE ISLANDS, between the lats. of 24° 10′ and 24° 15′ N., and in lon. 51° 58′ E., are two low islands, with some small islets and shoals to the West and S.W. of them, and great reefs to the North and N.W.: these islands are 10 leagues to the W.S. Westward of Dalmy Island, and the depths are from 9 to 22 fathoms in the direct line between them. The northern island, which is the largest, is called Yassart. Psyche Islands.

About 3 leagues to the W.N. Westward of Ras-el-Machereeb lies a headland, named RAS-EL-ADRAH, in lat. 24° 23′ N., and between these capes are two deep inlets, formed by the contiguous shoals and islands; and about 3 or 4 miles to the N.W. of Ras-el-Adrah is Rarah, or ST. THOMAS GROUP, consisting of several small islands and rocks. GOODWIN ISLANDS lie about 5 leagues to the N. Eastward, in lat. 24° 35′ N., lon. 51° 43′ E., from whence southward to Ras-el-Machereeb, and towards Psyche Islands, a continued chain of reefs and shoal banks extend, requiring great caution in any vessel which might approach the great bight to the westward of Dalmy. Ras-el-Adrah. St. Thomas Group. Goodwin Islands.

From Ras-el-Adrah the coast extends about 5 leagues to the westward, then takes a North and N.N. Easterly direction, by which a great bay, called Kore Daun, is formed, having several shoal banks in it, with soundings of 3 or 4, to 7, 8, and 9 fathoms between them, throughout the bay. Kore Daun.

RAS BOOGMAIS, in lat. 24° 37′ N., lon. 51° 31′ E., is about 4 leagues to the westward of Goodwin Islands, and forms the northern boundary of Kore Daun: a shoal extends 4 miles from it to the eastward, and about 4 miles to the N.W. of it, round a mount, called Jibbel Alladeid, is the entrance to a deep inlet, or back-water, called Kore Alladeid. JEZZERAT-AIN-LASSART, in lat. 24° 46′ N., lon. 51° 37′ E., distant 2 leagues from the main, is a group of three small isles, with some rocks and shoals near them to the northward, and a great shoal, named Fusht Alladeid, to the N. Eastward, which is dry in patches, and extends from lat. 24° 45′ to 24° 54′ N., its eastern edge being in lon. 51° 50′ E. To the S. Eastward of this shoal, and N. Eastward from Goodwin's Islands 5½ leagues, lies a small sandy isle, called Arlat Dalmy, with an extensive shoal to the S.W. and N. Westward; and Machassib, another small isle, is situated nearly mid-way between this shoal and Goodwin's Islands. Ras Boogmais. Jezzerat-Ain-Lassart. Fusht Alladeid.

RAS-EL-ALLARCH, in lat. 24° 59′ N., lon. 51° 38′ E., has a reef projecting 6 miles to the S. Eastward, called Fusht Arreif, and there is a passage of 3 miles wide between it and Fusht Alladeid, with depths of 6 to 14 fathoms. Between the tongue of Fusht-el-Arreif and the sandy coast to the westward is a bight, affording secure anchorage in N.W. winds, with depths from 9 to 3 fathoms. About 11 miles to the eastward of Ras-el-Allarch is the southern extremity of a large bank, called Rug Machassib, having many shoal patches on it, extending from lat. 25° 1′ N. to 25° 13′ N. in a N.N.W. direction. Ras-el-Allarch.

RAS ABOO-EL-MASHUIT, in lat. 25° 15′ N., bearing N. ¼ E. from Ras-el- Ras Aboo-el-Mashuit.

El Biddah. Allarch, is a projecting headland, having a bay to the N. Westward of it, surrounded by shoals, with the town of El Biddah at the bottom of the bay, about 4 miles to the West of the headland: and the low islands Jezeerat-el-Sufflie, and Jezeerat-el-Allilie, the first 4 miles, and the other about 7 miles to the N.N.E. of El Biddah.

Ras Luffan. RAS LUFFAN, in lat. 25° 54′ N., lon. 51° 37′ E., bears nearly true North from Ras Aboo-el-Mashuit, the coast between them being mostly low, or swampy, with some small indentations and shoal banks, projecting about 3 leagues from it in some places; but at Ras Luffan, and 10 miles southward, the shoal bank projects only from 2 to 3 miles off the land, and the soundings decrease gradually in approaching this part of the coast.

Ras Anfeer. From Ras Luffan, the coast takes a N.W. direction to Ras Anfeer, in lat. 26° 10′ N., distant about 8 leagues, having in this space some small bays, with the town of Al Owhalie 2 leagues W.N.W. from Ras Luffan, and Affeerat town about 4 leagues distant from the same headland. The shoal bank that lines the coast between these headlands extends generally about 1½ or 2 miles from the shore, with regular soundings in its proximity. About 2½ miles to the W.N.W. of Ras Anfeer is formed the projecting promontory of Ras Reccan (to be described hereafter), by a small island contiguous to the main land, which has a reef stretching out from it 2 and 3 miles to the North and N. Westward.

Seir Aboneid. SEIR ABONEID, north point, in lat. 25° 14′ N., lon. 54° 22′ E., is about 2½ miles in length North and South, and 2 miles broad, having a peaked hill at its S.W. part, with soundings of 3 or 4 fathoms very near the shore, and 14 or 15 fathoms about a mile from it all round. In a direct line from this island to Zircooa the soundings are generally from 18 to 13 fathoms. This island contains large quantities of sulphur, and has some mineral springs.

Zircooa. ZIRCOOA, the south end, in lat. 24° 52′ N., lon. 53° 13′ E., extends 3 miles to the N.N.W., and is the highest island on this side of the gulf. It is about 2 miles in breadth East and West, distant 16 leagues from the nearest coast. There are 10 fathoms water about a mile from the north end of the island, and 5 or 5½ fathoms 1 mile off its southern point, but a 2½ fathoms bank lies about 2 miles South from the south point. The Hesper had 14 fathoms water in passing not far from the east end of this island, and the depth decreased irregularly in steering from thence towards the coast, and near Boothabeen, where she anchored as mentioned above. Excepting Seir Aboneid, Zircooa is the easternmost of the islands, which lie in the deep concavity on the Arabian side of the gulf.

Jernain. JERNAIN, in lat. 24° 56′ N., lon. 53° 0′ E. (south point), lying about 4 leagues to the southward of Dauss, is about 1¼ miles in length N.W. and S.E., with three high hummocks nearly of equal height, two on the northern extremity, and one a little to the southward. When seen bearing S.E. by S. 5 or 6 leagues, it appeared to have no vegetation. Shoal water and foul ground front its south end and eastern side, from a half to 3 quarters of a mile, but the North and N.W. parts are more bold to approach.

Dauss. DAUSS (south point), in lat. 25° 9′ N., lon. 53° 1′ E., is about 1½ miles in length North and South, high at the north end, but low at the south. It appears to be

volcanic, and is destitute of trees, the S. Western extremity terminating in a low sandy point. There are 6 and 7 fathoms water within half a mile of the island, and in passing it at 4 or 5 leagues' distance, soundings were obtained in from 13 to 18 fathoms, coarse sand, with some overfalls.

ARZENIE, south point, in lat. 24° 46′ N., lon. 52° 42′ E., about 9 or 10 leagues to the S.W. of Dauss, is of considerable elevation, rugged in appearance, about 1½ miles in extent, North and South, and 1 mile in breadth. The N.W. and Western parts have 9, 8, and 7 fathoms, nearly close to the shore, but a 2-fathoms shoal lies nearly 2 miles from the eastern side: and an extensive 3-fathoms bank lies from 2½ to 5 miles to the N. Eastward. The Favourite anchored in 12½ fathoms, fine coral, sand, and shells, with the centre of the island bearing S. by E. ½ E., distant 5 or 6 miles. No fresh water was discovered, but from the ravines occasioned by heavy rains, some might probably be got by digging wells. It produces only a few herbs, but no trees, and the southern extremity of the island terminates in a low sandy point. Variation 4° 50′ W. in 1823. Arzenie.

DALMY, the south end, in lat. 24° 28′ N., lon. 52° 27′ E., bearing to the S.W. of Arzenie, when viewed at 4 leagues' distance, appeared rather high, of darker colour than the former island, and is about 5 miles long from north to south, and 3 miles broad. On its northern part is a round hill, below which the boundary is bluff, but not high; and excepting at the southern point, the island may be approached to 7 fathoms. To the S. Eastward it is nearly of equal height, with two or three hummocks above a very low, narrow sandy point, which extends from North to South, terminating the southern extremity; beyond which, a shoal spit of 2 fathoms extends to a dry sand bank at 2 miles' distance: there is no safe passage for large vessels to the southward of this island, on account of sudden overfalls, with several small isles and sand banks projecting from the main land of Arabia, said to be very low, and distant 20 miles to the southward of Dalmy. The channel between this island and Arzenie is clear of shoals, but the overfalls are sudden, from 15 to 21, and from 12 to 7 fathoms fine coral sand. Variation off Dalmy 4° 27′ West in 1823. Dalmy.

DAENY, or DANIE, in lat. 24° 57½′ N., lon. 52° 25′ E., bearing N. Westward from Arzenie, is about 1½ miles in length, narrow, low, nearly level with the sea. The colour of the sand in hazy weather renders it difficult to be distinguished when at a distance, and great caution is necessary in approaching this island, which has a shoal bank surrounding it and projecting above half a mile from the northern part, with two small islets near the N.W. point. The depths decrease regularly towards the bank all round. Variation 4° 23′ W. in 1823. Danie.

SHERAROW, south point, in lat. 25° 2′ N., lon. 52° 18′ E., to the N.N.W. of Danie, is rather low and narrow, extending only about half a mile N.W. and S.E., with two small hummocks on each extremity; and one mile off the northern point in a northerly direction, lies a small pyramidal rock above water, towards which and the island the depths regularly decrease, and there is a safe passage between the rock and the north end of the island. In a westerly direction from this island the coast ought to be approached with care, as it is very low, but said to be clear of shoals. The channel between Danie and Sherarow is thought to be safe, although His Majesty's Sherarow.

sloop, Favourite, is said to have had $3\frac{3}{4}$ fathoms the least water, on some overfalls, of sand mixed with white coral.

Hawlool.

HAWLOOL,* south point, in lat. 25° 40′ N., lon. 52° 27′ E., situated to the N.N. Eastward of Sherarow, is about a mile in length, of round form, and high in the centre, decreasing gradually at each extremity: it is destitute of trees, without any appearance of vegetation, and the soundings decrease gradually all round it, to 2 or 3 fathoms nearly close to the shore, but a rock above water lies at a small distance off the northern point of the island.

General character of the islands. Pearl Fishery.

The above islands appear to be of the same formation as Polior and the other islands on the Persian side of the gulf, being of a brownish colour, with a coral base; they are situated nearly in the centre of an extensive pearl fishery, which affords perhaps the best pearls in the world; and the season for this fishery is from April to September.

Ras Reccan and adjacent coast.

RAS RECCAN, in lat. 26° 11′ N., lon. 51° 18′ E., is the extreme point of that remarkable tongue of land, which projecting to the northward forms on its west side the gulf of Bahrein. The cape itself is the north point of an irregularly shaped island near the coast to the westward of Ras Amfeer, the northern main land point. A coral reef surrounds Reccan island, and lines the contiguous coast to the distance of 2 and 3 miles from the shore. This reef extends, with little interruption, from Ras Allarch along the shore already described to Ras Reccan, and from thence to the S.W. 5 leagues as far as Ras Asheridge.

The coast between Ras Reccan and Abboo Heyle, called by the Arabs the *Coast of Danger*, was unknown to Europeans until the late survey of the gulf by the officers of the Bombay Marine.

Kore Hussan.

KORE HUSSAN is a town, in lat. 26° 4′ N., lon. 51° 11′ E., by chron. from Busheer, and distant $3\frac{1}{4}$ leagues S. Westward from Ras Reccan. It was visited by Lieutenants Eatwell and Frederick in the Vestal brig, in March, 1810, and more recently, during the survey of the Arabian coast, by the officers of the Bombay Marine: vessels may anchor here in from 4 to 6 fathoms water, sheltered from all winds but those that blow from the northward.

Other villages.

There are several small villages along this part of the coast; Roees, close to Ras Reccan; Booder-hoof, 4 miles from it; Yamale, $6\frac{1}{2}$ miles; the next Yoafee, then Kore Hussan, Fraeyah, and Zabara, in lat. 26° 0′ N., which has extensive ruins. About 2 miles westward of the latter place there is a sharp point of land, called Ras Asheridge, forming a small bay on its eastern side, near the head of which is the village of Robeyjudge, on the coast about 2 miles South from Ras Asheridge.

Anchorage.

The Vestal, at anchor in $5\frac{1}{2}$ fathoms soft ground, off Kore Hussan, had Bahrein Island in sight from the mast-head, bearing about W. $\frac{1}{4}$ S., distant about 9 leagues. The shoal sand banks fronting Kore Hussan, with from 1 to 3 fathoms water, stretch across to the body of Bahrein Island; and DEBIL SHOAL, dry in several places, lies 5 leagues to the westward of Ras Reccan, and about the same distance East from Arad Island, its north end being in lat. 26° 17′ N. Another rocky shoal, in lat. 26° 11′ N., is about 2 miles distant from the south end of Debil Shoal in a S.W. direction; and the soundings from these shoals westward to the reef around Arad Island are from 4 to 7 fathoms.

Debil Shoal.

* This seems to be the island formerly seen by Commodore Watson, and called by him the Island May.

Scorpion Shoal, lies to the north of Ras Reccan, and the water deepens from 6 or 7 fathoms near that cape, to 17 and 18 fathoms near the shoal ; this with the Crescent Shoal has been already described.

To the westward of Ras Reccan the coast trends S.W. 4 or 5 leagues, and then S.W. by S. and S.S.W. to the head of the Gulf of Bahrein, in lat. 25° 9′ N., when it suddenly changes to N.N.W., forming the western shore of the gulf. Coast to the westward of Ras Reccan.

Between 6 and 7 leagues to the southward of Ras Asheridge, is the entrance of a deep inlet called Dooat-el-Ufzan. Off the point which forms its western side are the Warden Islands, the largest of which Jezeerat-el-Howuah, lies parallel with the general direction of the coast, and is about 11 miles long by the East India Company's charts of the Persian Gulf; some authorities give it less. The coast southward of the Warden Islands continues in a S. by W. direction for about 9 leagues to the head of the gulf, which forms a tongue-shaped bay, called Dooat-es-Elwah.

The coast forming the western side of the Gulf of Bahrein, runs from the head of the Gulf in a N.N.W. direction for about 5 leagues, and then N.W. by N. for 3 or 4 leagues, at which point a wide but slightly indented bay commences, having the island of Zuenone in its southern part, and the port of Jilla-Ogeia in its northern part.

JILLA-OGEIA or AYNDAR, on the western shore of the Gulf of Bahrein, is in lat. 25° 40′ N., and is the port of the late Wahabee capital of Deriah ; but the land is sterile and thinly inhabited along this part of the coast. Ayndar.

From Jilla-Ogeia the coast resumes a N.W. by N. direction to the parallel of 26° N., where there is an inlet called Dooat-Edlume ; to the northward of this inlet the coast takes a N.N.E. direction, and curving gradually again runs to the north-westward to the town of El Katiff, in lat. 26° 33′ N.

BAHREIN extends from lat. 26° 14′ to 25° 46½′ N., and occupies a central position in the Gulf of Bahrein. It is about 80 miles in circumference, it seems very fertile, and about one-fifth of its surface is cultivated, covered with plantations of date trees, &c. ; its northern shore extends nearly in an East and West direction. The chief town Manama, on the N.E. extremity, is large and populous ; the buildings are, comparatively, well constructed, and the place altogether appears more respectable than any other town in the Persian Gulf. The bazaar is well supplied with fine cattle, poultry, fish, vegetables, fruit, also with grain ; and a very considerable trade appears to be carried on with this port,* particularly by those tribes who inhabit the whole extent of the Arabian coast from Ras-el-khyma to Graen. Although plenty of cattle and fine large sheep were for sale, yet the prices demanded for them were higher than at any other port in the Gulf; and rice being an article of importation, was consequently both scarce and dear. Manama Town.

The population is supposed to amount to 40,000, or upward, who employ more than 140 vessels of different sizes in trading to various places, which produces considerable revenue ; but the pearl fishery is of the greatest importance to the island, which in the

* Lieutenant Tanner farther observes, that they possess many vessels of various kinds, so constructed as to answer for war or traffic ; he saw 38 vessels of large size, viz. Bugalars, Dows, and Trankeys, exclusive of numerous small craft and Diving Boats employed in the Pearl Fishery. The mast of one of the Bugalars measured 94 feet in length, and 8 feet in circumference, and her yard measured, in length, 141 feet 6 inches. There were also at this time several large boats building, and many absent at sea.

The people of Bahrein are hostile to the Imaum of Muscat, and friendly to the Jowassmee tribes about Ras-el-kyma, and were suspected, similarly with these tribes, to be disposed to acts of piracy when certain of success. Nevertheless they treated Lieutenant Tanner with every mark of attention and hospitality.

season employs 2,400 boats, each containing from 8 to 20 men, affording an annual product, it is said, of between sixteen and twenty lacs of dollars.

The town of Ruffin, situated on a hill 7 miles inland, is the next in consequence to Manama, but, like most Arab towns, consists of a Ghurrie or Fort, surrounded by inconsiderable houses, built on the ruins of a former town.

Water.

There are numerous springs of excellent water in the interior of Bahrein, but at too great a distance from Manama for a ship to be readily supplied.

Bahrein was visited in October, 1817, by Lieutenant T. Tanner of the Company's Bombay cruizer, Psyche, and the following directions for vessels proceeding thither are transcribed from his interesting and valuable observations.*

Departing from Berdistan Bank with the Hummocks of Kenn N.E. and Barn Hill East, steer S. by W. ½ W. by compass, which is thought to be the best course. Having approached the parallel of 27° N., keep a trusty person at the mast-head to look out for shoals or discoloured water, which from aloft can generally be seen at a considerable distance: here, also, the lead must be kept briskly going, for by steering the course mentioned above, you will get upon the PEARL or BAHREIN BANK, in about lat. 26° 50′ N., suddenly shoaling from 30 and 25, to 14, 10, or probably to 8 fathoms water, on a sandy bottom.

With a favourable wind or in the night, keep under reduced sail, to obtain true soundings, and be ready to anchor instantly, if you get less water than was expected. The soundings, however, as you proceed to the southward, will be from 9 to 8 fathoms, with overfalls occasionally from 9½ to 7 fathoms. Attention to the tides is necessary, which run strong on the springs, particularly as you approach the islands; they set about E.S.E. and W.N.W.

With an adverse wind, work between the meridians of 50° 45′ and 51° 5′ E., which space may be considered the *Fair-way;* for on either side of these limits there are dangers, the true situation of which is not correctly known.

In lat. 26° 50′ N., lon. 51° 10′ E., the Favourite sloop of war had 6 fathoms rocky bottom, which was thought to be on the edge of the Crescent shoal: betwixt this and the shoals to the Westward, on one of which, shortly to be described, the Durable was lost, may be considered the Fair Channel, as mentioned above. In this Fair Channel, there appears to be no danger until you approach the islands; and when in lat. 26° 30′ N. or 26° 28′ N., you will see from the deck the trees on the north point, called Bluff Point, of Maharag Island, bearing to the S. Westward, distant 3 or 4 leagues, in soundings from 8 to 5½ fathoms. If bound to the N.W. anchorage, haul up a point to the westward of Maharag; but a point to the Southward of it if bound to the S. E. anchorage: you will then raise the island of Bahrein, which is situated to the S.W. and is higher than Maharag.

Maharag, or Arad Island and Reefs.

MAHARAG, or ARAD ISLAND, is very low, and is surrounded by the JELLIA SHOALS and other reefs, which project from it 3 or 4 miles in some places, particularly in a N.W. direction from Bluff Point; for if this point bear S.E. by S., and a Portuguese fort in ruins, on the Western part of Bahrein, S.W. ½ S., you will be in 2½ fathoms on the Western edge of Arad Reef, with the rocks visible under the vessel. To avoid these reefs in proceeding to the N.W. anchorage, called Bahrein Harbour, haul to the westward towards the Teignmouth Shoal, till Portuguese Fort bears S.S.W. ½ W. or S.S.W., which seems to be a good leading mark to avoid the dangers on either side.

* Communicated by the late Lieutenant James Robinson, of the Company's Bombay Marine, who by perseverance, with very little assistance, and in a gun-boat only, completed a laborious and correct survey of the greatest part of the coast of Banca.

Maharag Island is irregularly shaped, and is nearly separated into two parts by a sandy isthmus, which is almost overflowed by the sea at high tides. The northern part of this island is usually called Sommahce, and the Southern division Maharag, on which the town of the same name is situated. This town is not near so extensive or populous as Manama, but is surrounded by a wall for matchlock defence; and a communication is constantly kept up between the two places by means of ferry boats.

The distance across the ferry between the two islands is rather more than a mile, and in it, nearest to Maharag, there is a narrow channel betwixt the rocks, which winds between the reefs to the N.W., affording a passage with 3 to $1\frac{1}{2}$ fathoms water, towards the S.E. anchorage. This is occasionally used in fine weather by the country boats drawing 6 and 8 feet water, but the tide is so rapid in this intricate channel formed between the reefs, as to render it hazardous even for a small vessel.

The only water used on Maharag, as well as that for supplying vessels, is brought up in skins by the divers from the bottom of the sea, at the depth of 3 fathoms, where there is a fine spring of good fresh water, with the top of a jar fitted to the mouth of it, through which the water gushes. From this mode of procuring water, it is reasonable to suppose, that it can seldom be procured quite fresh, and as a small supply of this brackish water is expensive, vessels bound to Bahrein should provide against the necessity of watering there. Water.

Near the Isthmus that connects these two divisions of Maharag, there is a village called Psetine, and fronting it about a mile to the Westward, upon the Middle Ground Shoal, stands a small flat islet called by the natives Gussaur Sawhee, having on it a kind of low tomb, not very conspicuous.

When at the N.W. anchorage with the bearings already mentioned, in sounding from the vessel in a S.S.E. direction towards the town of Manama, where the country boats lay, carried $3\frac{1}{4}$ and 3 fathoms water above a mile within the vessel, then shoaled to 2 fathoms sand, on the western verge of Breakwater Shoal, which stretches in an easterly direction parallel with the rocky bank that extends along the Bahrein shore, and connected with it at the inner harbour, leaving a channel between the reefs full 3 quarters of a mile in length E.S.E. and W.N.W., and rather less than a half a mile in breath, with soundings of 3 to $2\frac{1}{2}$ fathoms mud, shoaling as you proceed farther in, toward the inner anchorage, where the bottom is again sandy. This is situated in front of the Sheik's house, at Manama, where the boats lie conveniently in 1 to $2\frac{1}{4}$ fathoms at the bottom of the bight or channel, about 300 yards from the rocky banks on either side, and about a third of a mile from the shore, partly sheltered from North-westers by the S.W. projection of Breakwater shoal. This anchorage has also a convenient Hard, protected from the surf by a dam on either side, between which they haul up their largest boats for security or repair. Inner Harbour.

When in 2 fathoms sandy bottom, Portuguese Fort bore W. by S. $\frac{1}{2}$ S., Gussaur Sawhee N. by E., $\frac{1}{4}$ E., Water Castle E. by N. $\frac{1}{2}$ N., and the Sheik's House S.E. by S., distance half a mile. Anchorage.

FUSHT EL YARRON, or TEIGNMOUTH SHOAL, is a great reef to the N.W. of Arad Reef, and extends 6 leagues North of Bahrein Island, being the outermost of the shoals. The Bahrein Reefs nearly join its S.W. extremity; on the west side, it is separated from the reef that fronts the main to the southward of El Katiff Bay, by a narrow and shoal channel.

When Portuguese Fort bears from S.S.W. to S.W. by S., and Bluff Point from

East to E. by S., there are overfalls from 8 to $3\frac{1}{2}$ and $3\frac{1}{4}$ fathoms, then 5 and 4 fathoms, afterward shoaling gradually to $3\frac{1}{2}$ and $3\frac{1}{4}$ fathoms at the N.W. anchorage, which is convenient and safe for a short stay in the fine weather season, and sheltered by the island from south and easterly winds. But in the winter months, or during the season of hard North-westers, it is both unsafe and inconvenient, being exposed to the wind and sea in that direction, without any means of communication with the town. When at anchor in $3\frac{1}{2}$ fathoms sand, Portuguese Fort bore S.W. $\frac{1}{2}$ W., Bluff Point E. by N. $\frac{1}{2}$ N., Gussaur Sawhee E. $\frac{1}{2}$ N., and the Water Castle E.S.E., distant 2 or $2\frac{1}{4}$ miles off Bahrein, lat. 26° $15\frac{1}{2}'$ N., lon. 50° 40′ E. Variation 5° 40′ W. in 1827. Manama Town is in lat. 26° 14′ N., lon. 50° 37′ E., by the survey made in 1825. High water in the harbour at 5 hours 20 minutes on full and change of the moon, rise of tide 7 feet.

N.W. Anchorage. Tides.

The S.E. anchorage on the eastern side of the islands, between the Debil and Jellia Shoals, is in lat. 26° 11′, or 26° 12′ N., and being sheltered from all winds and sea, by the surrounding reefs, should always be preferred by a ship intending to remain longer than three days: it is however more difficult of access than the former anchorage, and the channel leading towards it between the reefs is so intricate, that a stranger ought not to enter it without a pilot, unless in a case of great emergency when one cannot be procured; this will seldom happen, for on making the usual signal, with a gun at the edge of the reef, a person will come off to conduct you into the port, or the men in the Pearl boats will come alongside, and offer their services for a few rupees.

S.E. Anchorage. Pilots.

El Katiff Bay.

EL KATIFF BAY, was visited by Captain Hamilton, in the brig Nautilus, in December, 1812, and it was surveyed in 1825, by Lieutenants Brucks and Rogers, who made Ras Tanhora, the north point, in lat. 26° 37′ N., lon. 50° 14′ E. This bay is of considerable extent, and has in it the flat island of Tirhoot, which is covered with date trees, and appears to be well inhabited and fortified. There is a smaller island called Deman 5 miles to the southward of Tirhoot; both of these islands are on the large shoal bank which nearly fills the bay and lines its western shore.

El Katiff Town is on the western shore of the bay, and bears West from the centre of Tirhoot island. There are several craggy hills, about 4 leagues S. by E. of the town, the most remarkable of them, called the Sugar Loaf, bears from the anchorage off Ras Tanhora, S. 21° W. In entering the bay, the Ras Tanhora point may be approached within half a mile or less, and a small vessel may haul close round it, in $3\frac{1}{4}$ or 3 fathoms, and anchor inside of it in 4 fathoms soft ground, but in every other place the bottom is hard, and the whole of the bay is nearly occupied by an extensive shoal, projecting 2 leagues off shore in some places. Having passed Ras Tanhora, steer for the Sugar Loaf till the Island Tirhoot is bearing about W.N.W., and the Sugar Loaf S.W. or S.W. by S., if you intend to anchor in the south part of the bay opposite to Sohat Town, which is 4 miles S.S.E. of Katiff, then anchor in $4\frac{1}{2}$ fathoms white sand and shells. By the survey of this place mentioned above, Katiff Bay seems to afford no shelter from N.E. or northerly winds, excepting for ships at a moderate draft of water, which can pass close round Ras Tanhora, and be sheltered under it as mentioned above.

The anchorage of El Katiff has the large bank of Fusht-el-Yarron or Teignmouth Shoal to the S.E., and the passage from the anchorage to the southward, between the reefs, as well as that at Bahrein, appears unsafe for large vessels.

Abaa Saafa, or Durable Shoal.

ABAA SAAFA, or DURABLE SHOAL, in lat. 26° 57′ N., lon. 50° 21′ E., was

discovered by the ship Durable, of Bombay, Captain R. Guthrie. This ship was wrecked on it, in the night, 21st Aug., 1817, proceeding from Bushire towards Bahrein, under convoy of the Company's cruizer, Ariel, which vessel narrowly escaped the danger. It was found to extend East and West 6 or 8 miles, and from 2 to 2½ miles in breadth, very steep, consisting of hard pointed rocks, and patches of sand in various parts, with depths from 1 to 2 and 3 fathoms. The survey of the Gulf makes it extend N.N.W. and S.S.E. 5½ miles, and marked with 1 fathom water.

Lieutenant Arthur, commanding the Ariel, describes the shoal to extend W.N.W. and E.S.E. about 10 miles in a narrow spit, the broadest part of the centre where the Durable was lost, being 2½ or 3 miles, which part he made 25½ miles West of Bushire Town, by good chronometers. As many shoals exist to the northward of Bahrein, every vessel bound to this island should keep on the meridian of Bushire, or not to the westward of it, till in lat. 26° 40′ N., then keep the lead going quickly.

There are several other dangers to the northward and N. Westward of the Durable Shoal, at a considerable distance from the coast.

From Ras Tanhora the coast runs in a N.W. direction to lat. 28° N., and afterwards about N. by W. to Grane, having several projections, contiguous islands, and deep indentations, fronted by dangerous banks in many places. It may be proper to add, that from Bahrein Island to lat. 28° 16′ N., the coast is fronted by numerous coral shoals, some of which lie at the distance of 8 and 10 leagues from the land.

RAS JIBBEL HUHARRIE, in lat. 27° 1′ N., is high, with a small isle contiguous, and bears West 20 miles from the Durable Shoal, having irregular soundings from 6 to 30 fathoms between them. Ras Jibbel Huharrie.

JEZERAT BOO ALLI, is the first large island to the N.W. of Ras Tanhora, and is contiguous to the main land. Its extreme east point, Ras Bod Alli, is in lat. 27° 17½′ N., lon. 49° 41′ E., and is a narrow neck of land, with a shoal stretching 2 or 3 miles from it to the eastward; shoal sand-banks occupy the deep bights, both to the southward of this neck of land, and to the westward of the island. Jezeerat Boo Alli.

YERREDEL BANK or REEF, in lat. 27° 11′ N., is low, and is situated on the transit line between Ras Bod Alli and Durable Shoal, a little nearer the former than the latter. It has soundings of 24 to 27 fathoms near it, decreasing regularly from thence toward the shore bank. Yerredel Bank.

JENNEE ISLAND, in lat. 27° 21′ N., is another low sand isle, surrounded by a reef, bearing nearly N. by W. from Yerredel, and E. by N. ½ N. from Ras Bod Alli, distant 3 leagues; having soundings of 20 to 10 fathoms close to it, and from 6 to 10 fathoms between it and Ras Bod Alli. Jennee Island.

In lat. 27° 31′ N., and 5 leagues N.N.W. from Ras Bod Alli, is the S.W. extremity of a sand and hard clay shoal, which extends N.E. by E. 5 miles, and is 4¼ leagues off shore.

BIDDULPH ISLANDS, are distant about 5 leagues to the eastward of the above-mentioned sand and clay shoal, and consist of 3 low sandy islands, surrounded by reefs. Two of them bear nearly North and South of each other, distant 4 miles; the southernmost called El Kraan, is in lat. 27° 38′ N., lon. 49° 51′ E., and the other, called El Kraing, is in lat. 27° 42′ N. The third and northernmost, is called Har- Biddulph Islands.

gose,* and bears N.N.W. 5 leagues from El Kraing. His Majesty's ship Hesper's boat landed on these islands, May 25th, 1813, and found from 9 to 12 fathoms water between El Kraan and El Kraing, and 28 to 30 fathoms a little to the eastward. Variation 4° 55′ W. (1825).

Keyn and Zazarine.

KEYN, or ARABY, and ZAZARINE, or FARSEY, the former in lat. 27° 47′ N., lon. 50° 9′ E., the latter in lat. 27° 59′ N., lon. 50° 8′ E., are 5 or 6 leagues to the eastward of the Biddulph Islands. They are both low and sandy, not to be seen above 3 leagues from the deck. Keyn, the southernmost, is a round sand-bank, with a few shrubs on it; the eastern point has rocks above water, and sunken rocks extend all round to the distance of half a mile, with overfalls from 20 to 14 fathoms, then to 5 and 3¼ fathoms; on which account, this island should not be approached nearer than 30 fathoms.

Zazarine, bearing nearly North from Keyn, distant about 4½ leagues, is rather larger than the other, having on the southern end a rock, resembling a boat under sail, when first seen; this island should not be approached nearer than 32 fathoms, there being 25 fathoms about 1 mile from it on the north side, and 22 fathoms very near it to the southward. These isles are frequented by turtle and large birds; ships seldom stand so far from the Persian shore as to see them, they being dangerous to approach in the night.†

Ras-el-Ghar,

RAS-EL-GHAR, in lat. 27° 33′ N., lon. 49° 14′ E., has soft ground 4½ to 6 fathoms, about 3 miles' distance to the eastward; but here, a chain of banks above and under water commence, extending along the coast N. Westward, to lat. 28° 14′ N., projecting in some places 5 leagues from the shore; the soundings decrease pretty regularly towards the edge of these banks, to 7, 6, or 5 fathoms.

and Ras Muchaab.

RAS MUSHAAB, in lat. 28° 11½′ N., lon. 48° 28′ E., is formed of high land, and is near the N.W. extremity of these extensive banks, betwixt which extremity, called Guttar-el-Meitma, and a shoal that projects 1½ miles from Ras Muschaab, there is an opening 3 miles wide, leading to the southward 3 or 4 miles, with depths of 6 to 4 fathoms, exposed only to northerly winds, being sheltered to the eastward by the chain of banks mentioned above.

Between Ras Mushaab to Ras-el-Zoor, the coast runs N. by W., the general direction before having been about N.W. by W. About 4 miles N. by E. ½ E. from Ras Mushaab, and 3 miles off shore, lies a small reef, to the northward of which the soundings decrease gradually to 4 or 3 fathoms towards the shore in most places, as far as Ras-el-Zoor; but from the two interjacent points, one in lat. 21° 25′ N., the other, called Ras Burhadge, in lat. 28° 19½′ N., shoal banks extend out about a mile.

Ras-el-Zoor.

RAS-EL-ZOOR, in lat. 28° 44′ N., lon. 48° 16′ E., is the south point of a bay formed between it and Ras Jillah, the northern extreme in lat. 28° 53′ N., both of which have reefs fronting them; and the bay is rocky and unsafe to approach within 4 miles of the shore, excepting about 2 miles to the South of Ras Jillah, where there

* This appears to be the island mentioned in the former edition of this book, under the name of Sandy Island, and near which the Hesper is said to have passed in May, 1813, although the latitudes given differ 5 miles. Hargose being in lat. 27° 56′ N., and Sandy Island in 26° 51′ N.

† The ship Nadree, Captain Hay, was wrecked on the Island Zazarine, in 1822, by running upon it in the night.

is a space of clear ground, with depths of 8, to 6, or 5 fathoms, where vessels might be sheltered from all winds between South and N.W.

From Ras Jillah, the shoal spit projects about 3 or 4 miles E.N. Eastward, having from 6 to 2½ fathoms on it, and 9 or 10 fathoms near its edge; and 2 leagues North, a little westerly from Ras Jillah, and 4 miles off shore, lies the reef named Guttah Arafian, having 7 fathoms close to, and the same depth inside till near the shore, which is safe to approach by the soundings, from Ras Jillah to the entrance of Graen Haven.

RAS-EL-LUR, or URHUD, in lat. 29° 20′ N., lon. 48° 5′ E., is the south-eastern extremity of the entrance into Graen Haven, distant about 12 or 13 leagues from Ras-el-Zoor; from the latter place, along this part of the coast, there are regular soundings of 6 and 7 fathoms near the main, increasing to 12 and 14 fathoms amongst the islands in the offing, but decreasing to 4 and 3 fathoms to the northward near the bank that surrounds the island Pheleche, fronting Graen Haven. Ras-el-Lur.

OMALMARADAM, or MULMARADAM ISLAND, in lat. 28° 40′ N., lon. 48° 35′ E., about 6 leagues to the eastward of Ras-el-Zoor, is the southernmost of three small islands fronting this part of the coast. GARROW ISLAND, in lat. 28° 49′ N., lies about 8 leagues off shore, and 4 leagues to the N. Eastward of Mulmaradam; and KHUBBER ISLAND, in lat. 29° 4′ N., lies to the N. Westward of Garrow. All these islands are safe to approach, with good channels between them; the channel between them and the coast, leading to the entrance of Graen Haven, is also safe, but the passage to the eastward of them is generally used by the Company's Packets, which frequent Graen Haven. Omalmaradam Island. Garrow and Khubber Islands.

GRAEN, or GRANE,* called also QUADE, in lat. 29° 23′ N., lon. 47° 58′ E., is inhabited by Arabs who have been long famed for their commercial spirit; and they employ a large number of vessels in trading to the Red Sea, Sinde, Guzerat, and other places on the western side of India, from whence they import coffee, grain, and Indian produce, for the supply of the interior. The haven is secure in most winds, where ships lie sheltered in 5 or 6 fathoms, about 2 miles to the northward or N. Westward of the town, which is situated on the southern shore: but a rocky bank of 2 fathoms must be avoided, that lies North from the town nearly 2 miles' distance. Small vessels may anchor in 4 or 3½ fathoms within the rocky bank, and to the N.W. of the town, at 1½ miles' distance. This haven stretches a considerable distance inland to the West and south-westward of the village of Graen; but its shores, particularly the projecting points, are lined by reefs, which must be avoided in sailing into the haven. The shoal bank fronting the northern shore projects a great way out, uniting with the shoal water that environs the island Pheleche, to the eastward of Graen, leaving no passage between that island and the north shore, except for small vessels. Although in the channel leading to Graen Haven, the depths decrease gradually on either side, so as to render the soundings a guide, yet, it is advisable, after passing Ras-el-Lur, to keep 1¾ or 2 miles from the southern shore, until the town point, Ras Joosa, is approached; and anchor with the town bearing *true* S. by W. ½ W., Graen.

* The Gerra of Pliny. An excellent survey of Graen Harbour was made in 1825, by the officers of the Bombay Marine, employed on a laborious exploration and survey of the Persian Gulf, which has been published for the benefit of navigation, at the expense of the East India Company, and is sold by Messrs. Allen and Co., No. 7, Leadenhall Street.

to avoid the rocky shoal bearing North from it, as mentioned above. Variation 6° West in 1825.

Pheleche.

PHELECHE, or FELUDSH ISLAND, off the entrance of Graen Harbour, extends in a N.W. and S.E. direction about 7½ miles, and is from 2 to 3½ miles in breadth; the chief town is situated on the N.E. side of the island, in lat. 29° 27′ N., lon. 48° 16′ E., or about 6 leagues to the eastward of Graen. The small sandy Island of Muchan, lies about 2 miles off the N.W. end of Pheleche, and the shoal banks which extend several miles around it, and dry at 3 miles distant from the east point, at low water, break off the sea from Graen Haven, when the winds blow from eastward: the soundings near the edges of the banks, on the S. and S.W. sides, decrease to 3 and 2 fathoms, there being from 9 to 14 fathoms water in mid-channel between them and Ras-el-Lur, which depths continue to the entrance of Graen Haven, then decrease to 8 and 7 fathoms, and to 6, 5, or 4 fathoms at the bottom of the haven.

Muchan Island. Soundings.

Koor Boobian and Koor Abdullah.

From the Island Pheleche to Basra Bar, shoal banks project far out from the low western shore, and ships pursuing this track, must be cautious that the flood tide does not horse them into Kore Abdullah, among the shoal banks of that great inlet, which is to the westward of Basra Bar. Kore Boobian, about 6 or 7 miles to the N.W. of the N.W. point of Pheleche, is barred up with dangerous shoals, and only accessible to boats at half flood.

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# PERSIAN GULF.

## PERSIAN SIDE.

To steer from Muscat into the Gulf.

FROM MUSCAT, Cape Jask bears *true* N. 29° W., distant 45 leagues, the variation in mid-channel being 4½° W. in 1819; but a course steered about N.W. by N. *by compass*, from the former place towards the entrance of the gulf, will carry a ship 4 or 5 leagues to the westward of Cape Jask, if there be no lateral current. When abreast of Kooe Mubarrack Rock, with a steady southerly wind, a course may be steered N.N.W., keeping within 3 or 4 leagues of the Persian shore; but with light variable winds, this shore ought to be kept aboard, to preserve anchoring ground, which is got from 2 or 3 miles, to 3 or 4 leagues from the eastern shore. The depths are 60 and 70 fathoms about mid-channel, in the entrance of the gulf, increasing to 90 and 100 fathoms near the Arabian shore. The Scorpion drifted in 3 hours, from 52 to 104 fathoms, and was obliged to anchor in this depth, within 1½ miles of the islands close to Cape Mussendom, the current setting strong to the westward among the islands, around that Cape.

Kooe Mubarrack.

KOOE MUBARRACK, the Blessed Hill, called also, Bombarack Rock, about a mile from the beach, in lat. 25° 52′ N., lon. 57° 20′ E., and about 10 leagues N.W. by W. of Cape Jask, is an isolated remarkable rock of square form, discernible

from a considerable distance at sea, and when it bears N. 44° W., a perforation is perceived in its eastern and upper corner, which is a mark for the following shoal.

KOOE MUBARRACK SHOAL, in lat. 25° 43′ N., bears S.E. from Kooe Mubarrack Rock, distant about 4 leagues, and if the perforation of the rock is kept open, it will carry a ship well to the south-westward of the shoal, which consists of lumps of rock, with clay between them. This rocky shoal is about a quarter of a mile long, having on the shoalest part $1\frac{1}{2}$ fathoms water, and close to it, 10, 8, and 7 fathoms clay: there is a channel of $4\frac{1}{2}$ to 6 fathoms between it and the shore. Kooe Mubarrack Shoal.

RAS KERAZEE, or CAPE KOOE MUBARRACK, in lat. 25° 48′ N., distant about 4 or 5 miles directly to the southward of Kooe Mubarrack Rock, is a projecting headland, at which the coast changes its direction from W. by N. to N.N.W. Ships passing this part of the coast in the night ought not to borrow under 15 or 16 fathoms, particularly when near the situation of Kooe Mubarrack Shoal, nor approach it nearer than 12 fathoms in the day. With Ras Kerazee bearing about N. by E. $\frac{3}{4}$ E., the Phœnix shoaled to 4 and $3\frac{3}{4}$ fathoms on a bank, then 4 or $4\frac{1}{2}$ miles off shore, and another ship grounded by keeping too close in with the land of this cape. Ras Kerazee.

RAS AYSHEER, in lat. 26° 2′ N., about $5\frac{1}{2}$ leagues N.N.W. from Ras Kerazee, is a projecting headland, having the hill Jibbel Serraow* about 10 miles to the N.E., and the high mount Jibbel Bees, about 25 miles nearly East from it, and about the same distance from Jask Bay in a N. Westerly direction. Ras Aysheer.

RAS KOLI, or CAPE HILL, in about lat. 26° 19′ N., projects very little from the coast line, and bears from Ras Aysheer about N. by W. distant 6 or $6\frac{1}{2}$ leagues; the coast is of moderate height, and forms an indentation between them, fronted by a shoal bank, extending 2 or 3 miles from the shore in some places. Ras Koli and coast adjacent.

The coast from Ras Koli runs in a northerly direction, gradually inclining more westerly until about the parallel of 27° N. it bends round to W.N.W. past the Minow River, and the island of Hormuz to the town of Bunder Abbas which is nearly on the meridian of the east end of Kishm Island.

From Cape Jask to Ras Koli, a ship may keep in soundings from 40 to 10 fathoms, in working, except when near Kooe Mubarrack Shoal, she ought not to come under 12 fathoms. About 4 miles to the northward of the former, there are 30 fathoms from 3 to 4 miles off shore, decreasing to 5 fathoms in a run of 2 miles towards it: but higher up the gulf, a ship may run from 30 fathoms 8 or 10 miles towards the land, before she is in 5 fathoms. When off Cape Jask, and until to the northward of Kooe Mubarrack Shoal, a ship should not come under 25 or 30 fathoms in the night, nor under 18 or 20 fathoms in the day: but when in lat. 26° 16′ N., or near Ras Koli, she may stand in to 12 or 10 fathoms in the night, and to 6 or 7 fathoms in the day. Sailing directions.

If abreast of Ras Kerazee, at 3 or 4 leagues' distance, with a brisk southerly gale, a N.N.W. course may be steered for the Quoins, distant about 20 leagues. From Ras Koli, a course about N.W. by W. is proper to pass them at a reasonable distance; and by keeping 8 or 9 miles from them, you may anchor in 30 or 35 fathoms water, if it fall calm; but near them the depths increase, with a stronger current.

* This hill is the northernmost of the high land on the coast, which is low to the northward of Ras Koli, but mountainous inland, both to the southward and northward of this cape.

From Cape Moossendom to the coast about Ras Koli, the breadth of the entrance into the gulf is about 10 leagues.

Having steered from Cape Kerazee about N.N.W. 18 or 20 leagues toward the Quoins, if it be night, continue that course until the depth decreases to 34 or 35 fathoms, then certain of being to the northward of the Quoins, keep away West, till past them; afterward, W. by S. 40 miles, then West until the Great Tumb is seen, distant 22 leagues from the Great Quoin. After rounding the latter island, in day-light the Island Larek will be seen, which is high; if the wind be westerly, stretch Kishm. over toward the east part of Kishm Island, taking care, in passing along, not to come under 30 fathoms in the night, nor under 20 fathoms in the day; for in these depths, Angaum. between the east end of Kishm and the Island Angaum, a ship will be from 3 to $1\frac{1}{2}$ miles off shore, and under 20 fathoms, the water shoals suddenly to 9 fathoms coral rock; but after passing Angaum, the Kishm shore may be borrowed on, to 5 or 6 fathoms in the day, and 7 fathoms in the night, a shoal bank extending to, and around the S.W. extremity of the island, called Bassadore Bank, on which the soundings are regular, the bottom being composed of soft white clay, or mud, having 4 and 5 fathoms at the distance of 2 leagues from the S.W. end of Kishm, decreasing regularly to that shore. From the edge of this bank, the water deepens fast on standing southward for the Great Tumb, from which the S.W. point of Kishm bears North. Between these, Tides. is the proper channel, on the north side of the Tumbs, through which the tide sets strong E.N.E. and W.S.W. along the edge of the shoal bank on the Kishm shore. High water about 10 hours, on full and change of moon. In working, a vessel should not stand too far out from this bank, that she may be able to anchor, if it fall calm.

Bunder Abbas. BUNDER ABBAS, formerly called GAMBROON, in lat. 27° 10′ N., situated on the main, 5 leagues north from Kishm Town, which is on the east end of the island of this name, was a place of great trade in the 17th, and part of the 18th century, but at present is destitute of commerce. With the town bearing N. by W. $\frac{1}{2}$ W., distant 3 miles, there is good anchorage in 4 and $4\frac{1}{2}$ fathoms mud, at low water spring tides; and the soundings are regular in this excellent harbour. The coast between this place and Ras Koli contains several villages, and is safe to approach within a moderate distance, the soundings decreasing gradually towards the shore, which is mostly low, but hilly inland; and 12 leagues to the north-eastward of Bunder Abbas is situated the mountain Jibbel Shemeel.

Hormuz Island. HORMUZ, ORMUZ, or ORMUS, distant 10 or 11 miles S.E. from Bunder Abbas, and the same distance N.N.E. from Larek, and of similar extent, has a fort at the north end, in lat. 27° 5′ N., lon. 56° 29′ E., by the late survey of the Persian Gulf. This island has a rugged appearance, and several of the high peaks are white from an incrustation of salt.* The entire eastern shore of the island appears safe to approach within a quarter of a mile, but the western shore is fronted by a bank, commencing from the north and south points of the island, and gradually widening till it forms a rocky spit to the S.W., in the direction of the Town of Kishm; the extreme point of the spit is two miles off shore. On the N.W. side of Hormuz there is good shelter from South-easters, by anchoring in 5 fathoms mud at low water, the fort bearing E. by N., the S.W. bluff point S.S.E. $\frac{3}{4}$ E., off shore about $2\frac{1}{2}$ miles, towards

* The Imaum of Muscat farms this island from the king of Persia at present, and obtains a small revenue from the rock salt; he also farms the town of Gambroon, and keeps an armed force there.

There are said to be two cisterns or tanks of fresh water on the N.W. end of Hormuz.

which, the depths regularly decrease. The channel between this island and the east end of Kishm, or rather between the rocky spit just described, and the sand which fronts the east end of Kishm, is 2 leagues wide, and very safe; that between it and the main has depths from 5 to 10 fathoms, and is also safe, by keeping within a mile of the Fort Point, as a shoal bank extends from the coast more than half-way towards the north point of the island. When the Portuguese possessed the city of Hormuz, it was one of the richest in the East, and a place of great trade: but after being taken in April, 1622, by Shah Abbas, king of Persia, with the assistance of the English, the trade was removed to Gambroon.

LAREK, LARRACK, or LAREDSH, 8 miles S.S.W. of Hormuz, and 5 miles S.E. of the east end of Kishm island, is about $5\frac{1}{2}$ miles long and 4 broad; it is barren, with very few inhabitants, not so high as Hormuz, and bears nearly N.N.W. from the Great Quoin, distant 7 leagues, its south point being in lat. 26° $49\frac{1}{2}'$ N. About one third from its west end, stands a remarkable conical hill, very perfect in form. There is no danger within half a mile of this island. Larek Island.

KISHM, or KISHMA,* ISLAND, the largest island in the Persian Gulf, extends about 20 leagues E. N. E. and W. S.W., the eastern part being 3 to 4 leagues broad; but from the middle westward, it is only from 3 to 6 miles in breadth. Kishm Island.

There is a good channel between Kishm and Larek, but in rounding the east end of Kishm, the sand-bank which fronts the shore of the island, at $1\frac{1}{2}$ miles' distance, must be avoided. This bank extends in a narrow spit from the grove of date trees on the eastern extremity along the shore, 4 miles past the town to N. Westward, having 2 and 3 fathoms water on it.

Kishm Town, in lat. 26° 57′ N., lon. 56° 19′ E., at the east end of the island, is walled round, and has a small oblong fort within the walls. To the northward of the town, the spit of sand is changed into a mud bank, extending out about 2 miles, and running parallel to the shore as before described. Ships may anchor off the town, well sheltered from West and S.W. winds; the Ternate in $4\frac{1}{4}$ fathoms at low water spring tides, had the fort of Kishm bearing S. 4° W., distant about 2 miles. High water at 11 hours on full and change of moon, the flood runs about W. N.W. $\frac{1}{2}$ W., and rises 12 feet. Kishm Town. Tides.

From Kishm Town, the coast stretches about N.W. 2 miles, then West and W. by S. in an irregular line to Inderabia Point, 26 miles to the westward, where it turns round abruptly to the S. S. E. toward the formerly piratical Port of Luft, in lat. 26° 54′ N., lon. 55° 50′ E., which lies on the bank of a deep inlet formed by swampy low islands, that fill the bay of Luft to the West and S.W. About $1\frac{1}{2}$ miles to the South of Inderabia Point, is situated the fort of the same name, which protects the narrow passage leading to the town of Luft. Luft.

* Called by the Arabs Jeziret Tauile, by the Persians Jeziret-Draas, and by the ancients Oaracta, where Arrian states Nearchus to have seen the tomb of King Erytheas, after whom the Persian Gulf was anciently named The Erythean Sea.

Although this island has a very sterile aspect, yet, before the inhabitants were oppressed by the Jowasmee pirates, 100 villages are said to have flourished on it; the natives at present are chiefly weavers, and appear hospitable.

The whole island, and a large portion of the opposite coast, in which are mines of brimstone, is farmed of the king of Persia by the Imaum of Muscat. A marine force from Bombay is usually stationed here, with some of the Company's troops, for the protection of commerce: Bassadore village being the chief place of rendezvous.

Luft Harbour is well sheltered; H.M.S. Chiffonne, in the expedition against the pirates, in 1809-10, at anchor in 9 fathoms mud, had the N.W. point of the road bearing N.W., Inderabia, a small woody island, on with the N.E. point N. ½ E., and Luft Town S.E. ¼ E., distant nearly 3 miles.

Inside these low islands in the bight of Luft, between them and the Kishm shore, is formed the channel called Core Goran, extending from Inderabia Fort due South 8 miles, then turning to the N.W. 2¼ miles, when it takes a S.W. by W. direction about 8 miles past the town of Goran, and unites with the proper channel of Clarence Strait. Core Goran is generally a quarter or half a mile in width, and although not more than a quarter mile wide in some parts to the westward, yet it is safe for ships, as the depths are from 4½ to 8 and 10 fathoms over a soft bottom. Goran village is near the west end of Core Goran, and several other villages stand on the Kishm shore from hence to Bassadore, with topes of date trees adjoining.

Kishm Strait. Kishm Strait, called also Clarence Strait, formed between Kishm island and the main, is about 2½ leagues wide at the eastern entrance, but becomes contracted to one mile by sand banks, about 4 or 5 leagues to the westward, on approaching Inderabia Point. It winds from hence, between low swampy islands and sand banks to Point Bassadore, the N.W. extremity of Kishm, and is usually from 1 to 2 miles in breadth between the shoals or islands on either side. The bottom in the fair channel is generally mud, with soundings from 12 to 6 fathoms in the eastern part, and from 4 to 8 fathoms to the S.W. of Inderabia Point; but the western entrance in some places has only 3, 3¼, or 3½ fathoms at low water, to the S.W. of Bassadore Point. A rocky ledge fronts this point about a mile distant, having a narrow gut of 8 to 10 fathoms water between it and the bank that lines the West end of Kishm and which extends from Bassadore to Drustacoon Point, the S.W. point of Kishm. It dries at low water to the distance of 1½ and 2 miles from the shore. Tides. The tides in Kishm Strait are strong, and in the narrow parts near Luft, where the bottom is rocky in some places, with irregular depths, they run with great rapidity, which renders the assistance of a pilot necessary in any ship proceeding through this channel, which, until lately, was little known to Europeans.*

Southern coast. The south coast of Kishm, from the Eastern extremity, is a little concave to the small town of Shusah, in lat. 26° 48′ N., near which there is a ruined pagoda. From hence to Messain, five miles further, it forms a bay, and from this village to Overfall Point, opposite to the Island Angaum, the coast extends nearly in a direct line. The usual depths along the part of the coast just described and about a mile off shore are from 14 to 16 fathoms till you come to Overfall Point, which must be approached with caution, being fronted by foul ground and irregular soundings of 6 to 4 fathoms, at one mile distance.

Angaum. Angaum Island, commonly called Angar, situated close off the south side of Kishm, nearly mid-way between its extremes, is of oblong form, moderately elevated, and about 5 miles in extent; its south point is in lat. 26° 37′ N., the north point in lat. 26° 42′ N., lon. 55° 56′ E.

The channel between Kishm and the north point of Angaum is about a mile wide, but contracted by the banks on each side; it affords good anchorage in 9 or 10 fathoms

* An excellent survey of Kishm Strait, on a large scale, in two sheets, has been engraved by the East India Company, and is sold by Messrs. Allen & Co.

sand, with the north sandy point of Angaum bearing about W. ½ S., off shore about half a mile; this anchorage is called Angaum Sound.* Sound.

To enter it from the S.E., keep one-third channel over from Angaum, but do not come under 7 fathoms toward it, nor nearer than 3 cables' lengths, as from 6 fathoms, the water shoals at once to 2 or 1½ fathoms in some places; and be cautious not to approach Overfall Point on the Kishm shore, mentioned above.

In Deristan Bay, to the northward of Angaum, there are some overfalls from 14 or 15 fathoms to 5 fathoms sand, but from the latter depth, the decrease is regular to 3 fathoms about a mile off shore. The western channel is very wide, but the west side of Angaum must have a berth of 1 mile, as you shoal from 6 fathoms mud to 2 fathoms rocks at a cast, within half a mile of the shore. The island may be approached to half a mile at the north extreme, in rounding which it may be approached within 200 yards with safety. The large bay to the N.W. of Angaum being exposed to sea-winds, is unfavourable for anchorage, but the 6-fathoms flat that extends from the western side of Angaum toward Kishm, may probably break the force of the sea; or, on the appearance of a S.W. gale, a ship at anchor might slip her cable and run into the sound. West Bay.

In September, 1811, Captain H. W. Sealy, of the Bombay Artillery, discovered three wells with fresh water on Angaum, the first within 100 yards of the beach, about half a mile southward of the east point of the island, being 22 feet deep, and 4½ feet in diameter, and had 4 feet water in it. The second well is about a quarter of a mile N.N.W. from S.E. point, and 300 yards from the beach, at the entrance of a valley; it had about 6 feet water in it, and was larger than the former. The third well is to the N. Eastward of the south point about a quarter of a mile from the beach, having one or two palm trees a third of a mile to the westward; it is on rising ground, 42 feet deep, 5½ feet in diameter, had 6½ feet water in it, a little inferior in quality to that of the two former wells. About 40 yards East of this, there is a fourth well, with one of its sides fallen in, and filled up, all but about 20 feet. In the dry bed of a river, on the west side of the island, also about the centre of a valley which extends nearly across the island, Captain Sealy thought that fresh water might be got by digging. Angaum was formerly supposed by European navigators not to contain any fresh water. Extensive garden ground, and ruins of houses here, and in other parts of the island, indicate its once flourishing state; and near the White Mosque at the north point of the island are the remains of a considerable town, with 18 tanks or reservoirs for holding water; about half of them are still arched over, and lined with brick, but they are much filled up with clay and sand. Fresh water.

Proceeding from Angaum to the westward, the soundings are regular toward Kishm, until the bank is approached, which is steep to, having 25 or 30 fathoms near its southern extremity, where the depths on it are only 2½ and 3 fathoms in lat. 26° 26′ N.; *white water* extends about a mile farther out. This bank, which should not be borrowed on, under 5 or 6 fathoms, is an excellent mark in the night or in thick weather, to point out a ship's position when passing between the S.W. extremity of Kishm and the Great Tumb. Bank.

Drustacoon Point, the S.W. point of Kishm, in lat. 26° 32½′ N., lon. 55° 24′ E., is fronted by the extensive bank of Bassadore, already mentioned. Drustacoon Point.

* H.M.S. Chiffonne, at anchor in the sound in 11 fathoms sand, had the red square building on Angaum, with an octagonal top bearing W. 15° S., the point that seems to form the east entrance as seen from the ship S. 21° E., point of Kishm E. 15° S., off shore one-third of a mile. There is said to be a small dangerous rock nearly in the middle of the sound, the marks for which are uncertain.

Bassadore Point.

BASSADORE POINT, the N.W. extremity of Kishm, in lat. 26° 39′ N., lon. 55° 22′ E., bears N. $\frac{1}{4}$ W. from the S.W. point distant 7 miles. A short distance inland of the point stand the ruins of the once flourishing Portuguese town of Bassadore. At this place there is an excellent harbour, but the approach to it is shoal. H. M. S. Chiffonne, in steering E. by N. $\frac{1}{2}$ N. for the point, had only 3 fathoms water in passing over an extensive flat, and in returning, had rather less at 3 quarters ebb; but the Mornington kept nearer to the Persian shore, and had not less than 4 fathoms water.

Sailing Directions for Bassadore Harbour.

Captain Grubb, of the Ternate Bombay cruizer, made a survey of Bassadore Harbour in 1821, for which he gave the following directions:—

If you come from the southward with a fair wind, bring the Great Tumb S.S.E. $\frac{1}{2}$ E., then steer N.W. by N. or N.N.W. by compass if in a large ship, being attentive to the tide, which is not always regular, but generally sets East and West, the flood running to the westward and the ebb to the eastward. Keep the Tumb S.S.E. while in sight, till Bassadore Point, on which the flag-staff is placed, bears N.E., then steer for it, being careful, if you deepen to 8 or 9 fathoms, to keep a point to the northward, or N.E. by N., having a good look-out for the flag on the Dry Bank off the point, which may be rounded about a quarter of a mile distance. The best anchorage is with the grove of date trees in one with the centre hummock bearing S. by E. $\frac{1}{2}$ E., in 7 fathoms soft mud.

There is a remarkable Notch in the high land on the Persian coast, which, if visible, is an excellent mark for coming in from the southward, by keeping it N. by W. $\frac{3}{4}$ W., and steering for it till Bassadore Point bears N.E. $\frac{1}{4}$ E., then steer in for Bassadore as before directed.

If you approach from the southward with an easterly or working wind, bring the Tumb to bear S.S.E. $\frac{1}{2}$ E., as mentioned above, and if flood tide, steer about N. by W., keeping away if you shoal to 3 fathoms, till Bassadore Point bears N.E., and the highest hummock E. by N., then you may haul to the wind, and stand over until Bassadore bears E. by N., and the highest hummock E.S.E., then tack, and stand over to the South Bank, observing that when you deepen to 8 or 9 fathoms you are near the South Sands, which are rather steep to; you should therefore tack on shoaling after having this depth, as 7 fathoms is close to the edge of the sands, with the highest hummock E.S.E. Ships should work between the sands to 8 fathoms toward the South Sands, and 5 fathoms toward the North. The channel in general is about 2 miles wide, and the tide strong; it is therefore useless to attempt to work against it, either going in or out.

If you are coming from the northward, steer to the eastward till Bassadore Point is seen, which with a fair wind bring to bear N.E. by E., and steer for it till the highest hummock bears E. S. E., and Bassadore as before mentioned; run in about N.E., keeping a look-out for the flag on the Dry Bank, which round, as first directed. The directions given for working in from the southward, are equally applicable in working in from the northward, excepting that a ship may borrow a little on the Persian side, but it will be prudent to adhere to them as near as possible, particularly if she draw above 15 or 16 feet water.

Working out of the channel, keep between 5 fathoms on the North Sands, and 8 fathoms on the South, till the highest hummock bears about East; you may then, if bound to the southward, stand over on the flat till Bassadore bears about N.E. and until you see the Great Tumb; or in stormy weather, it will be prudent to make short tacks till you deepen to 5 or 6 fathoms, then steer a course to the eastward or westward as may be required.

The soundings off the entrance are generally from $3\frac{1}{2}$ to $2\frac{3}{4}$ fathoms at low water spring tides, soft mud, but as you approach Bassadore Point, with it bearing N.E. and the highest hummock about E. $\frac{1}{2}$ S., you will deepen to 7 and 8 fathoms, and continue in this depth by steering N.E. The channel is formed by two sand banks, that on the South having only $1\frac{1}{2}$ feet water, that on the north side having from $2\frac{1}{2}$ to $1\frac{1}{2}$ fathoms, which is only dangerous as you approach the eastern point, but the channel being at least 2 miles wide, little danger is to be apprehended. The water being always smooth, a ship will seldom miss stays, but if this should happen, there is room to box-haul her; and if there be a doubt of missing stays, tack sooner than directed.

Tides. The tide runs about $2\frac{1}{2}$ knots per hour on the springs; high water at $11\frac{3}{4}$ hours on full and change of moon, and the rise about 8 feet. The anchorage is sheltered from North-westers by the Dry Bank off Bassadore Point. These winds, although retaining the name of North-westers from their general direction, usually incline in this locality to West and W. by S. About 300 yards from low-water mark, the depth is 7 fathoms, under which ships ought to anchor, as it shoals quick to 2 fathoms, and outside of that depth, it increases quick to 13 fathoms, where the tide runs stronger than in 7 fathoms.

The Persian coast from abreast of Bassadore runs in a S.W. by W. direction for about 20 miles to the town of Linga; having in this interval the towns of Bunder, Mallam, and Kong; the former 10 miles and the latter 3 miles from Linga. The soundings to the distance of 4 miles off shore appear to be regular, varying from 5 to 10 fathoms.

Linga. LINGA, in lat. 26° 33′ N., was the chief town of the Jowasmee pirates on the Persian Coast. The anchorage is good, with shelter from North-westers, as the outer point may be brought to bear W.S.W. or S.W. by W. when at anchor in 5 fathoms muddy bottom. The soundings off the town are regular.

The coast changes its direction at Linga from S.W. by W. to W. $\frac{1}{2}$ S. in which direction it continues for 18 miles to Ras Bostana. In this interval stand the towns of Yesha, Shenaz, and Bostana; the last named has a fort, and is about 4 miles East of the Cape. Refreshments may be procured in small quantities at Shenaz, the town next to the eastward of Bostana.

Cape Bostana. RAS BOSTANA, sometimes called Ras-el-Shenaz, in lat. 26° 29′ N., lon. 54° 40′ E., the first remarkable headland on the coast of Persia to the westward of Kishm, is a low sloping point with rugged hills behind it. Off this cape in a direct line S.S.W. $\frac{1}{2}$ W., are the shoals and island of Polior and the island of Nobfleur.

Polior Shoal. POLIOR SHOAL, in lat. 26° 26′ N., lies between Polior Island and Cape Bostana, within 3 or 4 miles of the latter, and nearly fronting Mogoo Bay; it is composed of rocks, shells, and sand, and is about half a mile in diameter, with irregular depths on it from 8 to 4 fathoms in general; but on the shoalest part, there are only 14 or 15 feet at low water. Polior Island bears from it S. by W. $\frac{1}{4}$ W. to S. $\frac{1}{4}$ W. distant 5 or 6 miles, extremes of the Persian Coast from N.W. by W. to E.N.E., and Cape Djrd on with the eastern fall of Cherak Hill. This hill is about 13 miles inland, in lat. 26° 56′ N., lon. 54° 4′ E. When bearing N. 48° W. will carry a ship clear to the northward of the shoal, and into Mogoo Bay, where there are 10 and 9 fathoms water within the shoal, decreasing over a bottom of mud, gradually toward the main. The channel between Cape Bostana and the shoal is $1\frac{1}{2}$ or 2 miles wide, with 10 or 11 fathoms water in mid-

channel: and the depths are from 16 to 40 fathoms outside the shoal between it and Polior Island, in a channel about 2 leagues in breadth.

Great Tumb. GREAT TUMB, or TOMB, in lat. 26° 15′ N., lon. 55° 24′ E., bears about South 24 miles from Bassadore Point, and is a low level island about 3 miles long, with some trees on it, and may be seen about 5 or 6 leagues from the deck of a large ship. It may be approached within three quarters or half a mile, and tolerable anchorage found under it during a North-wester: a bank projects 3 or 4 miles to the southward, not dangerous, as there is not less than 7 or 8 fathoms on it, except near the shore.

The Prince of Wales cruizer anchored in $7\frac{1}{4}$ fathoms sand, at low water, the island bearing from *true* N. 38° E. to N. $54\frac{1}{2}$° W., the large tree near the watering place N. 18° W. about 2 miles off shore: found the tide running East 3 miles per hour; rise and fall 6 feet. The boat in sounding, found the depths decrease regularly from 7 to $3\frac{1}{2}$ fathoms sand about a quarter of a mile off shore, and within this distance the bottom was rocky. In crossing the bank about 3 miles off shore in 10 to 12 fathoms, had overfalls of $1\frac{1}{2}$ and 2 fathoms, but never less than 10 fathoms water: off the east end of the island, there are 13 fathoms 1 mile off shore. The south point of the island is Watering place. low, and the watering place is at a well to the westward, near a banyan tree, at some distance from the beach.

Little Tumb. LITTLE TUMB, or TUMB NAMIU, in lat. 26° 15′ N., distant about $8\frac{1}{2}$ or 9 miles W. $\frac{1}{2}$ N. from the Great Tumb, is barren, and not so regular in appearance as the other, and like it is uninhabited. This island seems to be clear of danger; the Prince of Wales anchored in 18 fathoms about $1\frac{1}{2}$ miles off shore, the extremes bearing from N. 18° W. to N. 77° W., and the boat found the depths decrease regularly to $1\frac{3}{4}$ fathoms within a ship's length of the shore. Steering round to the west end of the island, a mile off shore, had from 10 to $7\frac{1}{4}$ fathoms: from the West to the N.W. end, had from 7 to 15 fathoms hard sand, with the north extreme bearing E. 15° N., south extreme S. 60° E.; and the boat found not less than $5\frac{1}{4}$ fathoms at a cable's length from the shore: off the N.W. end, in a sandy bay, she got 5 fathoms within a ship's length of the shore. With the island bearing from E. 12° S. to S. 32° E., had 30 fathoms about half a mile off shore.

Bomosa. BOMOSA, or BOUMOSEH ISLAND, in lat. 25° 54′ N., lon. 55° 8′ E., distant about 7 leagues to the S. by W. $\frac{1}{2}$ W. of the Little Tumb, and 12 leagues N.N.W. $\frac{1}{4}$ W. from Sharga, is an uninhabited island, about 3 miles long, conspicuous by a high round hill near its centre, with several small hummocks at the east end. There is deep water near it all round.

Surde. SURDE, or SURDY ISLAND, in about lat. 25° 56′ N., 9 leagues to the westward of Bomosa, and 7 leagues to the South of Polior, is of triangular form, and 3 or $3\frac{1}{2}$ miles in extent. From the western side of the island foul ground projects 1 mile, also from the N.E. and S.W. side, but the east side of the island, and the southern part, where the town is situated, there is anchorage, and where water and refreshments, it is said, may be obtained at moderate prices; the N.W. side also affords water. There are three or four hills on the island, two of them near each other; and near the highest of these hills stands a Mosque or white pagoda.

Nobfleur. NOBFLEUR ISLAND, called Nabio-Froor by the Arabs, in lat. 26° 11′ N., bear-

ing about S.S.W. from Polior distant about 5 miles, has a hill near the east end, which in most views forms a saddle, and may be seen 6 leagues from the deck, but the other parts of the island are low. It may be approached within the distance of 1½ or 2 miles all round, as the depths decrease pretty regularly towards it, and there are from 28 to 40 fathoms mud about 2 miles off, but a ledge of rocks above water is said to project from the N.W. end. In the channels among these islands, also betwixt them and the Tumbs, and to the southward of them, the usual depths are from 35 to 50 fathoms, decreasing towards the Arabian coast.

POLIOR, called Froor by the Arabs, in lat. 26° 18′ N., lon. 54° 35′ E., is an uninhabited island, situated to the South of Mogoo Bay, about 4 or 4½ miles long from N.N.E. to S.S.W., and 3 miles broad, decreasing to the south extremity, and it may be seen 7 leagues. Two rocks above water lie about a cable's length off its west end, but in all other parts the island seems steep, and may be approached within a cable's length on the east side. A ship may lie completely sheltered from a North-wester, by anchoring in 28 fathoms about a quarter of a mile from the shore, with the extremes of the island from S.W. ½ W. to North, and Nobfleur S.W. ½ S. On the north side of the island, there are 40 fathoms within half a mile of the shore. Polior Island.

The Prince of Wales found various depths in passing along the west side of the island at 3 quarters of a mile to 1½ miles distant, from 7 fathoms rocks to 25 fathoms no ground; and no danger was perceived, excepting the two rocks above water, mentioned above. In some parts, the bottom was from 8 to 10 fathoms sand, about half a mile off shore; and off the north end of the island, 10 fathoms was found within a quarter of a mile of the shore.

With a westerly wind, turning across the west entrance of Kishm Channel from Cape Bassadore, attention to the tides is requisite, as they sometimes run 3 or 3½ knots, for 6 hours each way. Having crossed over in soundings at discretion, from 6 to 10 fathoms, but in the night 8 fathoms is close enough, the water will deepen to 13 fathoms in Shenaz Bay, where there is good anchorage about 3 quarters of a mile off shore in 10 fathoms, with the Mosque bearing North, and Cape Bostana W.S.W. Here a vessel is well sheltered from the violence of the North-westers, and may procure refreshments at a moderate rate. Directions.

With a turning wind, the channel between Polior and the main should be chosen, which is wide, but a ship drawing above 12 or 13 feet water, must be careful to avoid Polior Shoal, already described; and if irregular hard soundings are got on the edge of it, she ought to haul off from it immediately.

But with a southerly, or steady fair wind, when abreast of the Little Tumb, steer West about 20 miles, then W. ½ S. for Polior, observing to pass between it and Nobfleur nearly in mid-channel, or rather nearer the former; a good look-out is proper in the night, when running between these islands, as the water is deep and not fit for anchorage, and the soundings are no guide in approaching them, except very close to the shore.

A ship having passed to the southward of Polior with a fair wind, a course steered W.N.W. 8 or 9 leagues, will bring her near the Island Kaez in regular soundings; when this island bears N. by W., or in the night, she should not come under 20 fathoms towards it, for from 17 fathoms the water shoals suddenly to 7 fathoms rocky bottom, on a reef that projects 1 or 1½ miles from the south part of the island.

RAS DJRD, also called Cape Certes, in lat. 26° 36′ N., is distant about 14 miles Cape Djrd.

N.W. by W. from Cape Bostana, and the Bay of Mogoo is formed between them, having regular soundings all over it, on a bottom of stiff clay, with shelter against the prevailing winds in the gulf, and it has capacity for the largest fleets. Mogoo Town lies at the bottom of the bay, in lat. 26° 37′ N., off which a ship may anchor in $5\frac{1}{2}$ fathoms, with it bearing N. by E., and the western extreme W. by N. about $1\frac{1}{2}$ or 2 miles off shore, where she will be sheltered from North-westers. The best berth to ride during a South-easter is in $6\frac{1}{4}$ fathoms clay, off shore 3 quarters of a mile, Polior Island S. $\frac{1}{4}$ W. to S. by W. $\frac{1}{2}$ W., extremes of the bay from W. by N. to E.S.E. $\frac{3}{4}$ S. To the north-westward of Ras Djrd is a bay of 10 miles extent, Towenah Point forming its N.W. limit. The town of Djrd stands on the shore 3 miles North of the cape of that name; and 6 miles N.W. of Djrd, the town of Charack on the most northern shore of the bay. The coast then runs in a westerly direction for 27 miles to Cheroo Point. Off this part of the coast, about mid-way, lies Guase or Kenn Island.

Mogoo Town.

Anchorage.

Guase Island.

GUASE, or KENN, called also Keish by the inhabitants, in lat. 26° 29′ N., its south point, lon. 54° 2′ E., is fruitful, well inhabited, and better planted with trees than any island in the gulf; it is low, not to be seen above 4 leagues, and is 6 or 7 miles in length, W.N.W. and E.S.E., and 3 or 4 miles in breadth. A ship may anchor abreast the village at the S.E. end of the island in 9 fathoms sandy bottom, the extremes from N. $\frac{3}{4}$ E. to W. $\frac{1}{2}$ N., and Charak Hill N. by E. $\frac{1}{2}$ E., off shore $1\frac{1}{2}$ miles, where she will be sheltered from a North-wester. Water and other refreshments are obtained here at moderate prices, but the inhabitants of these islands, although apparently civil, are generally hostile to Europeans in small vessels, and not to be trusted. There is also anchorage off the town at the N.E. end of the island in 8 fathoms mud, about $2\frac{1}{2}$ miles off shore, with the island bearing from N. 38° W. to S. 15° E. *true*, and a small fort S. 52° W.

Supplies.

The island is safe to approach by the soundings, where there is anchorage, in case of necessity, at the east, west, or north sides of it; but 9 or 10 fathoms is sufficiently near for any vessel, as from these depths the water shoals suddenly on the bank that lines the northern side of the island. Between it and the main, the channel is about 2 or $2\frac{1}{2}$ leagues wide, with 26 to 30 fathoms in the middle, decreasing regularly toward the coast, but it shoals quickly when near the island, from 24 to 12 and 14 fathoms sandy bottom; then to 10 fathoms about a mile off. Charak Hill, which is a remarkable hill on the main, bears N.N.E. when on with the island, and is a good mark for it. If passing in the night between the island and the main, you shoal fast toward the former, tack or haul off from it, and when the soundings are 20 and 25 fathoms regular, you will be in a fair track.

Channel.

Coral Shoal.

FIVE FATHOMS SHOAL, of coral rock and sand, about 2 miles in extent, bears W. $\frac{1}{2}$ N. 11 or 12 miles from the W. end of Guase. The depths on it are from 5 to 9 fathoms, and there are from 18 to 30 fathoms water near to its edge. When the Mornington was upon the shoalest part, Charak Hill bore *true* N. 41° E., and the N.W. end of the Island Inderabia N. 48° W.

Inderabia.

INDERABIA ISLAND, in lat. 26° 41′ N., lon. 53° 40′ E., is low and level, and is about $3\frac{1}{2}$ or 4 miles in extent East and West, with a grove of date trees near its centre. The channel between it and Cheroo Point on the main-land is from 2 to 3 miles wide, with soundings from 6 to 7, to 10, 12, and 17 fathoms mud, and it is quite

safe, by giving a berth to the shoal spit fronting Cheroo Point, which bounds the east entrance of the passage.

CHEROO BAY, on the east side of the point of this name, has regular soundings of 10 to 6 and 5 fathoms near the shore, affording safe shelter from West and N.W. winds; and Inderabia Channel affords shelter from southerly winds, by anchoring under the island, or near the main to the northward of Cheroo Point, if the wind blow strong from the eastward. Cheroo village is subject to the Sheik of Nakiloo. The coast to the westward of Cheroo Point runs N.W., for about 16 miles to Nakiloo Point, off which lie the islands of Sheik Shaib and Shitwar. The coast is low near the shore, but is backed by a range of mountains inland.

The shore is mostly steep, and should not be approached under 15 fathoms in the night, this depth being within a mile of the shore, which is clear of danger, having 5 or 6 fathoms very near the beach.

SHEIK SHAIB,* or BUSHEAB, in lat. 26° 48′ N., lon. 53° 25′ E., the eastern extremity, extends W. by N. and E. by S. about 14 miles, and is of middling height and level, with groves of date trees, particularly on the side next the main; it is inhabited, and subject to the Sheik of Nakiloo. The channel between it and the main is about 6 miles wide at the eastern entrance, and about 3 leagues wide in the middle, the usual depths from 16 to 24 fathoms. The eastern entrance is contracted by a rocky spit that projects 2 miles in a N.E. direction, from the east end of the island, having a passage of 4, 5, and 6 fathoms water between it and the Island Shitwar. Sheik Shaib Island.

The island on both sides is lined by a shoal bank, which projects about a mile, in some places, having 4 and 3 fathoms rocks upon it, near the middle of the south side of the island, and 23 fathoms mud near its edge, not above a mile off shore. The Benares cruizer tacked upon it in 2½ fathoms rocks, Goroole Town bearing *true* E. 9° N., the other extreme N. 38° W., not above a pistol-shot off shore.

A rocky shoal surrounds the west end of the island to a considerable distance, having 3 and 4 fathoms water on it, about 1½ miles off the west end of the island, and there are 24, 20, and 18 fathoms close to its outer edge, at the West and S.W. parts. This reef is dangerous to approach in the night, for a snow belonging to Bombay, not long ago, was wrecked on it, and her cargo was seized by the Sheik. Not long afterwards, one of the Company's Packets ran upon this island in the night, and was wrecked. At the east end of the island there is good anchorage in 5 or 6 fathoms, where fresh water may be got, but the Sheik some years ago was a predatory chief, not to be trusted.

SHITWAR, or SCHITTUAR, is a low small island, separated from the east end of Sheik Shaib by a channel about 3 quarters of a mile wide, in which there are 5, 6, and 7 fathoms water; but a spit that projects from the S. E. end of Sheik Shaib, at the extremity of which there are only 2 or 3 fathoms, contracts the channel here to half a mile, which has only 3 fathoms water in this part. The best track is about a third over from Shitwar, but this passage is too contracted for large ships. Shitwar.

The channel between Shitwar and Nakiloo Point, on the main, has depths from 12

* This name is a corruption of Abu-Shayib, or *Old Father*, but the island is more usually called by the natives Sheik Shaib, or *Old Sheik*.

to 17 or 18 fathoms, decreasing towards the point to 4 or 5 fathoms near the shore, and it is very safe.

Nakiloo.

NAKILOO, a town on the coast opposite to the island Shitwar, has a fort and a detached tower for its protection, with regular soundings near the shore; but the anchorage is exposed to N.W. winds, and the town is within a point of land that forms the south side of Derrabin River.*

A bay called Bunder Upsalain is formed by the coast to the westward of Nakiloo; it is 10 miles in extent, and has soundings in it from 5 to 18 fathoms. The coast from the west point of this bay continues in a N.W. by W. direction for 15 leagues to Ras Nabend.

Directions.

Having passed between Polior and Nobfleur, and being 6 or 7 miles to the southward of Guase, a ship should steer N.W. by W. 10 leagues, the island Busheab will then be seen, and ought not to be approached on the south side nearer than 40 fathoms, this depth being about 2 miles from the shore.

Crescent and Scorpion Shoals.

CRESCENT AND SCORPION SHOALS,† in the survey of the Persian Gulf, are placed much more to the westward, and nearer the Arabian Coast than the Pearl's account of them, as given in the bottom note.

They are probably the Pearl Banks, marked in the chart of the survey of the Gulf, near the Durable Shoal, and 10 or 12 leagues to the E.N. Eastward of Ras Tannora, the north point of El Katiff Bay.

Having passed Sheik Shaib on the south side, at 3 or 4 leagues' distance, a N.W. course should be steered until soundings are obtained on Berdistan Shoal, which is an excellent guide. In working between Busheab and Ras Nabend, do not come under 30 fathoms in the night, for 25 fathoms is within a mile, and in some places half a mile of the shore. In this space, there is no shelter from the North-westers, nor any good anchorage.

Ras Nabend.

RAS NABEND, or CAPE NABON, in lat. 27° 23′ N., lon. 52° 40′ E., slopes gradually in a low point to the northward, from a piece of regular Table Land; but a little to the southward it is uneven. Within two miles of the cape, the water shoals suddenly from 30 to 13 fathoms, and a Shoal Bank lines the northern side of it, extending into the deep bay formed on that side of the cape.

In this bay there is good shelter from southerly winds in 3 to 5 fathoms, but a 3-fathoms bank lies in the entrance near the northern shore, about 4 miles N.N.E. from the cape, with 7 to 10 fathoms water in the passage between them; and 5 fathoms in the narrow passage between the 3-fathoms bank and the north shore.

About 3 miles inside this cape, lies Nabend Town, on the south side of the bay, formerly a lurking place for pirate vessels, ready to surprise defenceless traders.

* There is no river shown in the chart published by the E. I. Company.

† Crescent Shoal, in about lat. 26° 44′ N., lon. 51° 43′ E., lies S.S. Eastward from the Cape Berdistan, and about 27 leagues West from Busheab; the depth decreases from 36 and 38 fathoms, soft ground, to 26 and 28 fathoms, rocky bottom, close to the edge of this dangerous shoal, which is nearly dry. About 6 leagues S.W. by W. from this, there is another shoal of a round form, having a ridge extending to the northward, called the SCORPION, which is in about lat. 26° 34′ N., also nearly dry, with soundings around, and to the westward of it, from 15 to 22 fathoms, rocky; between them the bottom is of similar quality, and the depths vary from 16 to 25 fathoms. These shoals were discovered in May, 1796, by the ship Pearl: between them and Ras Nabend, the soundings are generally from 30 to 44 fathoms; and a ship ought not to stretch so far over from the cape, as to approach either, or get on the foul ground of the Pearl Banks, bordering upon these shoals.

When they saw a ship in the offing, a small boat was dispatched with a few vegetables, or other refreshments, as a decoy, but in reality, to make observations on the strength of the ship, to enable them to judge if an attack ought to be made by the vessels from the river.

ALSALOO, or ASLAUN, is a town nearly opposite the northern low point of Nabend Bay, to the N.W. of the river which falls into the bay. Near it is Nackle Tacky, another village: from this to Taurie, in lat. 27° 40′ N., the coast is nearly straight, and proceeds in a N.W. by W. direction to Ras-el-Mara, near the town of Congoon, the coast then takes a direction nearly West about 8 or 9 leagues toward Ras Mulgurrum. The land round Congoon Bay is high, and this part of the coast is well sheltered from North-westers by the foul ground to the westward of Berdistan. Alsaloo, Taurie, and Congoon Bay.

Several villages are situated on the coast between Alsaloo and Congoon; the coast is safe to approach.

CONGOON, in lat. 27° 49′ N., lon. 52° 9′ E., the northernmost town in the bay of this name, has good anchorage, in 5½ to 7 or 8 fathoms, stiff mud, and shelter from North-westers. Behind the town the land is high and remarkable; the summit of one of the hills appears like a barn, and is called BARN HILL, or Jibbel Serai; it is a guide in rounding Berdistan Shoal, and stands about 3½ leagues nearly E. by S. from the town. Congoon.

About 3 leagues West of Congoon, in lat. 27° 48′ N., there is a small projection forming the western point of Congoon Bay; it is sometimes called Cape Berdistan, but the true cape is 8½ leagues West of Congoon.

RAS MULGURRUM, sometimes called CAPE BERDISTAN, in lat. 27° 50′ N., lon. 51° 38′ E., has two isles near it; and about 4 leagues inland, bearing N. by E., is Jibbel Dring, or the Hummocks of Kenn, visible 15 leagues in clear weather; and to the W.S.W. 4½ or 5 miles on the western part of the shoal which lines this part of the coast, lies the small island Monakilah, covered with trees. Ras Mulgurrum.

MULGURRUM, or BERDISTAN SHOAL, is very extensive, and the breakers on the foul ground lie in two ranges; one of these projects from the Island of Monakilah to the S. Eastward, about 3½ leagues, between which and the inner range, there is a space about 1½ miles broad, where small vessels might anchor in 4 or 5 fathoms, stiff clay, and be sheltered from North-westers in case of necessity. The inner range of breakers extends along the coast 5 leagues to the eastward from Monakilah; and within 5 leagues of Congoon, where shelter from westerly winds will be found by anchoring under the east end of these shoals, at which part the soundings decrease regularly in the west part of the bay. In approaching this foul ground, the lead is a proper guide, as the depths decrease regularly to the edge of the shoal. Mulgurrum, or Berdistan Shoal.

After passing Ras Nabend with a westerly wind, a ship ought not to stand farther North into the Bay of Congoon than lat. 27° 35′ N., or she may be obliged to haul to the W.S.W. or S.W. in rounding the foul ground of Berdistan. Several vessels, after getting 30 fathoms in that bay, have afterwards steered out W. by S. and W.S.W., and shoaled from 25 fathoms to 10, 6, and 4 fathoms hard ground, on the bank, which ought to be approached by a stranger with caution, observing not to come under 10 fathoms in the day, nor under 13 fathoms in the night. With a working wind, a stretch in may be made during the day, when the bearings of the land are seen. Directions.

Barn Hill should be kept to the northward of E. by N. $\frac{1}{4}$ N., till the Hummocks of Kenn are bearing to the eastward of North, in rounding the edge of the shoal. When these hummocks bear N.E., a ship is clear to the northward of all danger on the foul ground of Berdistan.

Except in the gap between the breakers, there is no shelter from the North-westers on any part of the bank, which may, when blowing hard, render it necessary to run to the S. Eastward round the breakers, and anchor under lee of them, or in Congoon Bay, if practicable. When this is necessary, much ground is lost by running to the eastward for shelter, and in getting out of the bay when the wind changes. Off the gap in the reef there are regular tides, which run about 2 knots per hour, W.N.W. and E.S.E., nearly in the direction of the coast. High water from $7\frac{1}{2}$ to 8 hours on full and change of moon; rise of tide 9 or 10 feet.

Tides.

From the Island Monakilah to Ras Yebreen, about $2\frac{1}{2}$ leagues to the N.N.W. there is a chain of rocks or islets above water, inside the fair track, being near the shore. Ras-el-Khann, in lat. 28° 2′ N., is a low point of land to the N.W. of Ras Yebreen, about 10 miles, having a swamp or marsh within it. From this point the coast, which is safe to approach, extends N.N. Westerly 18 leagues to Ras Halilah, in lat. 28° 50′ N. Halilah Bay is formed on the south side of the headland of this name, having Ramah Tower on its eastern side, 10 miles E.S.E. of the cape, and Halilah Peak E. by S. $\frac{1}{2}$ S. about 12 or 13 leagues inland. In the Bay of Halilah, under the point, a ship may anchor, and obtain water more expeditiously, of better quality, and cheaper than at Bushire.

Halilah Bay.

Halilah Hill. HALILAH HILL is a long ridge extending nearly N.N.W. and S.S.E., the peak or southern part being in lat. 28° $40\frac{1}{2}$′ N., lon. 51° 38′ E.; another part, called the Paps, lies directly to the East of Bushire; and the northern part of the ridge, or brow of the hill, is in lat. 29° 19′ N. There are two remarkable hills on the high land near the shore, in lat. 28° 29′ N., called the Ass's Ears.

After the Hummocks of Kenn are brought to bear E. by S., the coast is clear of danger to Bushire, with regular soundings, and may then be approached into any depth at discretion, having good anchorage in 5 to 10 fathoms.

Directions. After rounding Berdistan Shoal, not coming under 12 fathoms in the night, nor under 10 fathoms in the day, when the Hummocks of Kenn bear E. by S., or E.S.E., and being in 14 or 15 fathoms, with a fair wind, steer N.N.W. 14 or 16 leagues, you will then be near the south part of the low land of Rischar; in sailing along, from 20 to 25 fathoms are good depths until Rischar Point is approached within 4 leagues, then they begin gradually to decrease to 12 and 10 fathoms. It will be prudent with a S.W. or southerly wind not to borrow under 12 fathoms in crossing Halilah Bay, but when the low point of Rischar is bearing about E. by N., the shore may be approached occasionally to 5 or $4\frac{1}{2}$ fathoms, until a ship anchor in Bushire Road. With the town bearing E. by N. the anchorage is very convenient, as a boat can then sail off, and on, between the ship and town during a North-wester.

Great attention to the lead is requisite in passing Bushire, as the low point of Columa bears nearly W.N.W. from the town, distant 11 miles, and is scarcely discernible, even in the day; a few shrubs or bushes is all that can be seen when in 3 fathoms, but the soundings decrease regularly toward the shore.

Bushire. BUSHIRE, or BUSHEER, in lat. 29° 0′ N., lon. 50° 51′ E., is situated on the north point of a low peninsula, of which Ras Halilah, about 4 leagues to the southward,

forms the other extreme. The peninsula is a dry sandy desert, subject to inundations by high tides, but the town is tolerably supplied with fruits and vegetables in their season, brought from the inland country. The water is brackish, but said not to be unwholesome. Sheep, goats, and small bullocks are procurable, and fowls of excellent quality. This town was formerly fortified by a wall and towers, but is now defenceless, and in a ruinous state. The variation in 1827 was 5° 0′ W. Supplies.

Inside to the North-eastward of Bushire Point is an extensive circular inlet or basin, its northern shore running in a westerly direction towards Cape Columa, which is about 10 miles N.W. by W. of Bushire. This inlet is nearly filled with sand-banks, some of which dry at low water: between these sand-banks are the navigable channels which form the inner anchorage of Bushire. Near the eastern shore of the inlet is the long low island of Sheik Shaad, and on the main-land opposite its north end the town of Shaaf. There is a narrow channel, having from 2 to 5 fathoms water, leading from Bushire Road round the north end and inside the island. There is also a small island just inside Bushire point with a similar channel running along its southern side after passing Bushire.

A ship arriving off Bushire with a strong southerly wind, ought not to anchor in the outer road, where there is no shelter from such wind, and the extensive shoal between Columa Point and the road forms a lee shore. The North-westers blow directly into Bushire, and when the southerly wind is strong, the North-wester may be expected with nearly double violence; it is therefore a bad road, with either of these winds. Anchorage.

When a vessel drawing less than 14 feet arrives at this place, and intends to go into the inner road or harbour, the signal should be made for a pilot, who is sent out without delay, as it would be dangerous to enter without one. On the bar the depths are $2\frac{1}{4}$ and $2\frac{1}{2}$ fathoms, and within it, in the inner road, 3 and $3\frac{1}{4}$ fathoms; high water at $7\frac{1}{2}$ hours on full and change of moon; rise of the tide $5\frac{1}{2}$ or 6 feet. Here, as at Bombay, and on the Guzarat coast, the day tides are the highest when the sun has north declination; but they are highest in the night when the sun is in the southern hemisphere. Pilots. Tides.

The land at the back of the town is high, the most elevated part being the ridge and peaks of Halilah Hill, described above. Pilots for Basra may be obtained at Bushire.

KARAK, or KAREDSH, is an island about $4\frac{1}{2}$ miles in length, N.W. and S.E., of moderate height, distant from Bushire about 11 leagues, and may be seen from the road of Bushire in clear weather. The Fort is on the N.E. point of the island in lat. 27° 17′ N., lon. 50° 21′ E., and may be passed within a cable's length. On the north and east sides, this island may be approached to 5 fathoms, but on the other sides, it is not safe to come under 15 fathoms. The whole island, except the N.E. sandy point, is lined with coral rocks, which on the N.E. and south sides, extend in some places half a mile from the shore. The channel between Karak and Korgo is very safe, and about a mile wide in the narrowest part; there are 5 fathoms water within 50 fathoms of the N.E. sandy point. If the wind blow strong at South or S.W., a ship may find anchorage near this island; and when in 4 or 5 fathoms with Bushire Town bearing E. by N., or E.N.E., a course steered N.W. by W. will carry her direct for the fort. She ought to anchor between the islands of Karak and Korgo in 6 or 7 fathoms, smooth water; but if a sudden change of wind from N. Westward be apprehended, it would be imprudent to remain in this situation; in such case she ought to weigh immediately, and after passing round the fort, anchor to the S. Eastward of it in 9 or 10 fathoms, about half a mile from the shore. With a N.W. wind, the best anchorage is in 9 Karak. Directions.

fathoms sand, the Brab-Tree in the fort bearing N. 57° W., and the south extreme of the island S. 20° W. *true* bearings. With a S.E. wind run into the channel, and anchor to the northward of the large bushy tree near the wells, it bearing S. 16° W., the brab-tree in the fort S. 37° E., and the N.W. extreme of Karak West, in 8 fathoms sand.

Water and other refreshments.

The water at Karak is much better than that of Bushire, particularly at the wells on the north side of the island, near the large tree : firewood is very scarce, what they have being brought from Bender-rigk, and the northern coast. Fish, which is plentiful, and dates, form the principal food of the inhabitants, for they have no grain but what comes from Bushire, and very few vegetables. Bullocks, sheep, and poultry, are to be procured, but at exorbitant prices when a supply is wanted.

Pilots for Basra.

The best pilots for Basra are procured at this place ; to carry a ship there and back, they generally receive 150 or 160 rupees, with the addition of 50 more for the trankey that attends, and provisions for five or six people. It is customary to give a bag or two of rice to the sheik, and one to the pilot's family. During the time the ship is stationary at Basra, he receives 10 rupees per month.

Island Korgo.

KORGO, or KOUERI, is a small low sandy island, 4 miles long, and half a mile broad, it is 2 miles north of Karak, and its north point in lat. 29° 23′ N. Except on the N. E. side, it is surrounded by a bank of coral rock. The shoal extending from the N.W. side of Korgo, about 3 quarters of a mile, should not be approached under 10 fathoms, as the water shoals from 7 fathoms suddenly, to 1 fathom coral rocks. To avoid this reef in coming from the N.W., do not bring the N.W. extreme of Karak to the westward of S. by W. till the fort bears S.E. by S., you may then haul up for the channel, keeping better than half a mile from Karak. The north and east sides of Korgo are not so dangerous, the depths there decreasing gradually to the edge of the rocky bank that surrounds it. The ground about these islands is very indifferent for anchorage, being loose hard sand in several places. A regular tide runs through the channel between the islands, from $1\frac{1}{2}$ to 2 knots per hour on the springs ; high water about 9 hours, on full and change of moon.

Tides.

On both ends of Korgo, there is water, but not so good as that on Karak. The best anchorage is near the N.E. part of the island, where are a few tall date trees, and near them a watering place.*

Anchorage.

From Columa Point to Bender-rigk, or Bunda Reight, in lat. 29° $24\frac{1}{2}$′ N., the distance is $6\frac{1}{2}$ leagues, the coast between them extending nearly North and South, and is safe to approach by the soundings. Bunda Reight is fronted by two small isles ; and Core Gassair, which is an inlet to the southward, in lat. 29° 12′ N., is fronted by a shoal bank projecting $1\frac{1}{2}$ miles from the shore.

Ras Poshoon.

RAS POSHOON, in lat. 29° 39′ N., lon. 50° 28′ E., is 6 leagues distant, and bearing about N.W. by N. from Bunda Reight. S.E. of Poshoon is Gonarra Bay, so called from the mosque and extensive ruins of this name near the shore, in lat. 29° 33′ N. About a mile to the southward of Gonarra is a small inlet called Core Khalele. In Gonarra Bay, ships may anchor in 4 fathoms, and be sheltered from northerly winds by the land of Ras Poshoon projecting to the westward. About 7 miles to the northward of this head-land, part of the chain of interior hills approach within 4 miles of the coast, directly East from Cooe Bang.

* Here about 40 Englishmen were cut to pieces in 1768, when Karak was besieged by the British.

RAS-EL-TOMBE, in lat. 29° 55′ N., lon. 50° 11′ E., is about 8 leagues to the N.W. of Ras Poshoon, and the coast, which has some inlets or shoal creeks, runs in this space nearly in a direct line, and is free from danger, the soundings decreasing regularly to the shore. Ras-el-Tombe.

DOOAT DELLIM, is a large bay formed to the northward of Ras-el-Tombe, on the eastern shore of which is Bunda Dellim, in lat. 30° 2′ N., bearing N. by E. about 2 leagues from the Cape, and a little to the southward of it there is a remarkable Table Hill near the sea. The northern shore of Dooat Dellim takes a W. by S. direction, towards the sands and islands adjacent to the easternmost branches of the River Euphrates. The Bay of Dellim has regular soundings of 5 and 4 fathoms, decreasing to 2 fathoms near the shore. The Fort of Shah-hiel Shiek stands on the east side of the bay, 3 miles North from Bunda Dellim.

RAS TULOOP, in lat. 30° 8′ N., lon. 49° 15′ E., is a low point of the main land, having the islands Buna and Derah, from 1 to 3 leagues to the W.S.W. with their adjoining shoals; and the large bank called Fusht-el-Myariene, extending from it in a S.S.E. direction about 4 leagues, the southern extremity of this bank being in lat. 29° 57′ N., having close to it 5 and 6 fathoms water. Indian River entrance is small, and is in lat. 30° 4½′ N., 5 leagues to the eastward of Ras Tuloop. Four miles S. Eastward of Indian River, is the southernmost projection of this part of the coast, with Barcan Sand surrounding it to the distance of 4 miles, which turning round to the northward fronts Indian River, and lines the coast from thence westward to Ras Tuloop. Between Barcan Sand and the east side of Fusht-el-Myariene, there is a space of soft bottom, about 4 miles wide, with soundings of 5 and 4 fathoms at the entrance, decreasing to 3, 2½, and 2 fathoms inside. Ras Tuloop.

Between Ras Tuloop on the East, and Boobian Island on the West, the head of the Persian Gulf is intersected by the branches of the Euphrates and other rivers flowing into it. River entrances and banks at the head of the Persian Gulf.

To the westward of Ras Tuloop is a large inlet 15 miles wide, having in it many sand-banks, and the islands of Buna, Derah, and Guba Nakada; the two former have already been mentioned and lie in the entrance of the inlet. Guba Nakada lies 9 miles up the inlet on the sand-bank which lines its eastern shore. Among the islands the depths vary from 5 to 14 fathoms.

Between the sand-banks and the western shore of the inlet is the river entrance channel called Kore Moosah. Its entrance is in lat. 29° 57′ N., from whence it proceeds in a northerly direction 15 miles to the island of Guba Nakada, when it bends a little to the westward, and 6 miles higher up divides into two branches; the eastern one is called Dorack River (a town of that name being situated on its banks 33 miles N.E. of the entrance), and the western one Bunder Monsure.

About 16 miles further West from Kore Moosah, is Kore Gufgah, having the extensive mud-flat of Alie Meidan between them, on which are regular soundings from 1 to 5 fathoms. Capt. Brucks remarks that "if a vessel, running for Bassorah River from the eastward, crosses the Alie Meidan flat, in 3½ fathoms low water, she will cross Kore Gufgah in 8 or 9, and ought to keep to the southward a little, as this is the parallel of the Meyune Sand, which lies in the entrance of the Bassorah branch. If she crosses the Alie Meidan in 4 or 4½ fathoms, which is the best line, she will cross Kore Gufgah in from 13 to 15 or 16 fathoms, according to the time of tide, and the tail of the

Abadan Sand in 4 and 5 fathoms, when a West course, if a flood tide, will bring her on the Abdallah Bank in $2\frac{1}{2}$ or 3 fathoms low water, which is a fair berth for anchoring should the tide not be favourable for entering the river. From this anchorage a vessel can run into Kore Abdullah, if it come on to blow hard from the S.E., at which time no pilot will cross the bar."

Basra River entrance.

About 10 miles West of Kore Gufgah, is the entrance of Basra River (Shaat-al-Arab), between the Abdallah Bank on the West, and the Abadan Bank on the East. These banks, like most others formed at the mouths of rivers, project a considerable distance from the land, in this case 12 miles, the entrance being between the two heads of the banks, where it is about 3 miles wide, but it is almost immediately separated into two narrow channels by the Meyune Sand, already noticed, which lies mid-way between the banks. The depths in the entrance are from 3 to 7 fathoms, with a bottom of soft mud favourable for anchoring, when delayed by the state of the tide in entering the river. The Meyune Sand nearly dries in some parts at low-water spring tides, leaving a channel a third of a mile wide on its western, and a quarter of a mile wide on its eastern side ; the depths in these channels are from 1 to 2 fathoms. When past the Meyune Sand the two branches unite and form one channel nearly a mile wide, which runs in a straight line N.W. by N., 8 miles to the entrance points of the River, and 4 miles inside of them in the same direction. The river then bends northerly, and proceeds with slight windings to Bassorah. The soundings in the River are given in Capt. Bruck's survey, as far as 18 miles from the Meyune Sand, or 10 miles above the entrance points. The general depths in this extent of the river channel, are from 2 to 5 fathoms ; its general width is about 3 quarters of a mile.

Abreast of the eastern entrance point is the opening of à narrow channel, which, running parallel with the shore, unites Basra River with Kore Gufgah ; this ought only to be used in case of necessity, and then only by small vessels.

About $2\frac{3}{4}$ miles inside of the western entrance point, is the village and tower of Manamah, and there is also a village on the eastern side of the river, nearly opposite.

Kore Abdullah.

Kore Abdullah entrance is in lat. 29° 52′ N., lon. 48° 20′ E., and at the northern part has a small branch communicating with the Basra, or Euphrates River. Extensive banks and breakers line each side of the entrance of Kore Abdullah, which is about 3 miles wide, with regular soundings of 4 to 3 fathoms. Kore Boobian, from its entrance in lat. 29° 33′ N., stretches to the N.N.W. about 8 leagues, then curves round to the N. Eastward, and unites with Kore Abdullah, forming a branch of it. A ship in the night should be careful not to get amongst the banks bounding the entrance of Kore Abdullah.*

To sail from Bushire to the northward.

Departing from the Road of BUSHIRE for BASRA, after passing Point Columa, you will deepen to 14 or 15 fathoms, and may then steer about N. N. W. for Ras Poshoon, if the wind is fair, keeping in from 10 to 14 fathoms in the night. With a contrary wind, you will be obliged to anchor when the tide is unfavourable.

To sail from Karak to Basra River.

Departing from Karak with a fair wind for Basra, the pilot will steer N.W. by W. till he shoals the water on the banks called by the pilots Caraba, having irregular soundings on them, and overfalls from 12 to 7, and from 7 to 5 fathoms ; he then keeps away according to the time of tide, with the flood W. by S. with the ebb W. by N., till he sounds on the Alie Meidan : this is a flat 12 or 14 miles long, having regular sound-

* The survey of the entrances of the rivers at the head of the Persian Gulf, by Lieutenants Brucks and Haines, of the Company's Marine, sold by Allen and Co., will prove valuable to any ship bound for Basra ; by this chart it appears, that the depth of water on the bar is less than formerly, and the channel much more contracted than was hitherto supposed.

ings on it, 6 fathoms at the southern edge, 5 and 4 in the middle, and 2 or 1½ fathoms on the northern part, within 3 or 4 miles of the low coast; but he seldom goes under 5½ or 5 fathoms. When he comes near Shaat-al-Arab, the mouth of Basra River, the water deepens quickly from 5 to 10 or 12 fathoms; if in 5½ on Alie Meidan, it will deepen to 14 or 16 fathoms in crossing Kore Gufgah, which denotes being near the bar of Basra River, but he still continues to steer W. by N. or W. by S., hauling up, or keeping away half a point, as he finds necessary. After these soundings in Kore Gufgah, the depth decreases quickly to 4 or 3½ fathoms on the tail of Meyune Sand, which is nearly dry in some parts at low water spring tides, and fronts the channel leading into the river, the passage being on the west side of this sand, not half a mile wide, with only 1¾ fathoms of depth at low water springs.

Having got 3½ or 3 fathoms on the verge of Basra Bar, or tail of Meyune Sand, with these soundings the pilot still stands across West, or W. by N., till he deepens to 5 fathoms in Kore Abdullah, and there anchors until the next flood tide; or if he has sufficient tide to carry him over, he stands away to clear a bank between Kore Abdullah and Basra River. When he finds himself on the centre of the bar by his soundings, which are usually 2¾ and 2½ fathoms mud, the rushes at the entrance of the river will be seen, if the weather is clear, bearing from N.W. by W. to N. by E., and the mouth of the river about N. N.W. When the water deepens to 3½ or 4 fathoms, he is over the bar, which is about a mile* in breadth, and is most dangerous on the east side, the Meyune Bank forming that side, being hard sand. The bar is in lat. 29° 50′ N., lon. 48° 36′ E. The Bar.

Departing from Karak with a N.W. or W.N.W. wind, a ship should pass round the east end of Korgo, then haul to the northward with the flood tide, which sets here N. by E. or N.N.E., she ought then to stand up for Ras Poshoon, and the ebb tide will be of advantage if she can weather the cape; if not, it will be prudent to anchor under the lee of it in Gonarra Bay, where there is good ground in 6 or 5 fathoms. With the first of next flood, a small stretch out may be made, and from hence to Bunder Dellim, the coast may be approached to 6 fathoms in the night, or 5 fathoms in the day. To proceed with a N.Westerly wind.

With a N. Westerly, or turning wind, from Dellim, keep close to the banks, working with the flood, which sets N.N.W. It is advisable, in working to the westward, not to come under lat. 29° 40′ N., nor to the northward of lat. 29° 55′ N.; whilst in about 29° 50′ N., you will be to the eastward of the bar; for to the westward you cannot exceed its latitude, so the latitude is in that case a guide; the chief dependence, however, must be on the soundings.

After working across the banks till you judge yourself near the bar, the soundings in Kore Abdullah are an excellent guide, for there you deepen to 20 fathoms when well to the southward; it will then be proper to tack, and in standing N.N.E. or N. by E. with the flood setting N.W. you will shoal to 4½ fathoms, then deepen to 15 fathoms in Kore Gufgah. After tacking from hence, and standing W. by S. or W.S.W., you will pass along the bar in about 4 fathoms, and afterwards deepen in Kore Abdullah to 8 or 10 fathoms; it will be proper to tack again to the Eastward, passing the bar in 3 fathoms; if the flood is strong you will weather Kore Gufgah, and instead of having deep water, you will have 2½ or 3 fathoms on Meyune Sand. You must then tack, and stand to the westward, and will probably have 3 and 2¾ fathoms mud on the bar, but ought to cross over till you deepen to 4 or 4½ fathoms in Kore Abdullah, and afterwards make short tacks across the bar; the rushes will then To work into the entrance of Basra River.

* By the late survey, the fair channel over the bar is only half a mile wide, with a depth of only 1½ to 1¾ fathoms at low water spring tides in the fair season.

soon be perceivable. Be cautious when the depth decreases in standing to the eastward, as the Meyune Bank, which bounds the channel on that side, is rather steep to.

In entering Basra River, the rushes are discerned at 9 or 10 miles' distance, but the pelicans are sometimes seen before the land, appearing on the banks in great numbers, and making it resemble a white beach. The winds blow mostly down the river, all the year round, and when a north-wester is violent, the atmosphere is obscured by the sand driven along before the wind.

The pilots not to be implicitly trusted.

Few of the pilots speak any other language than Arabic, and they are not altogether to be trusted, as they are liable to make mistakes in approaching the river; it is, therefore, prudent to be attentive to the directions for approaching the bar and crossing over it, particularly to the soundings, which are the only guide. When on it in very clear weather, the high land of Remers or Ramus, is sometimes seen bearing N.E. by E. ½ E. distant 20 leagues. It is high water on the bar at 12 hours, on full and change of moon, and one hour later every 15 miles up the river; the distance from the bar to the town of Basra, is about 90 miles, therefore the difference of the tides between the two places is 6 hours, so that it is high water, on full and change, at 6 hours off Basra Creek. The variation here in 1812, was 5° 15′ W. at the bar of the river.

Tides.

To proceed up the river.

When you have crossed the bar, continue to work during the flood. In approaching the entrance of the river, you see nothing on either side but long bulrushes, then in 4 or 5 fathoms, keep the larboard shore a-board till you get well into the river, then work close over from side to side, till you approach Chillaby Point, which is on the starboard hand, and known by the first plantation of date trees on that side the river; there are some scattered trees to the southward, but not worth notice.

Chillaby Point.

Off Chillaby Point, the water is deep, 12 fathoms in mid-channel, and 7 fathoms close to the sand that projects from the point, but never come nearer to it than 9 or 10 fathoms; opposite this point on the western shore, is a grove of trees, called Dorah. When round Chillaby's Point, keep nearest to the starboard shore; from this to Chubdah Island never stand farther over than to open the island with the point of the same name. From Chubdah Island to Barain, or until near Deep Water Point, keep close to the starboard shore, which is steep to. Between Chubdah Point and Deep Water Point, there are five islands close to the western shore; Chubdah is the largest, and planted with trees; the others small and uncultivated. These islands ought not to be approached nearer than 4 fathoms at low water, but the shore opposite to them is bold, having 6 and 7 fathoms water at the distance of 5 fathoms from the trees.

Deep Water Point, and Malah Island.

Deep Water Point, on the larboard shore, is reckoned half-way from the bar to Basra, from whence the shore extends to the westward, and afterward to the northward, forming a great bight, with the Island Malah opposite to it on the eastern shore. Off Deep Water Point, 14 and 15 fathoms are within a few yards of the shore, but although the Island Malah has the shoalest water, it is better to borrow on it than toward Deep Water Point, where are strong eddies, rendering it impossible to govern a vessel when among them. In keeping close to the Island Malah, attention to the soundings is requisite, for from 7 fathoms, the water shoals quickly till you are past all the trees on the larboard side, which from hence are continued to Basra; but by the tombs, are thinner than any where else.

Haffar River.

When past the Island Malah, the river becomes narrow, and two or three tacks from thence will fetch Haffar River, which is three-fourths of the way up; here you may approach either shore, but Zaine Point, or the larboard side, has the shoalest water.

From Haffar to Sybelyat, which is half-way between the former and Basra, there is

a sand bank projecting from the northern shore, nearly to the centre of the river, where a vessel has not above two cables' lengths to work in; and 3, or 3¼ fathoms, is the depth in mid-channel. From Haffar to Abelkasal, or Abelkaseeb, and from thence to Chillaby Island, 4 fathoms is the deepest water, continuing to keep nearest to the larboard shore. There are two islands, the northernmost called Surajee, and the other Chillaby Island: here the channel is very narrow, on account of these islands being nearly in the centre of the river; they are 5 or 6 miles in length, and when you pass the north end of Surajee, the mosque at the entrance of Basra Creek is discernible. Here you moor in 4 or 4½ fathoms, within a cable's length of the western shore; if the starboard anchor is placed to the northward, and the other to the southward, the outset from the creek will generally swing the vessel the right way. *Chillaby Island and Surajee.* *Basra anchorage.*

BASRA, BASRAH, or BUSSORA, is a port which carries on a considerable trade with Muscat, and various parts of India, particularly in Arabian horses, which are exported from thence. The factory is in lat. 30° 29½′ N., about lon. 47° 40′ E.; variation 5° 30′ W. in 1812; the difference of latitude between the town and the bar at the entrance of the river is about 34 miles. The town of Basra is situated on the principal branch of the Euphrates, generally called Basra River. *Basra.*

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## PASSAGE FROM THE GULF OF PERSIA TO THE MALABAR COAST.

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As the Winds are generally favourable for sailing down the Persian Gulf, particular directions are not requisite. A vessel having cleared the River Euphrates, may steer a direct course to pass in sight of the Island Karak, and from thence to get soundings on the Bank of Berdistan. After passing over this bank, a course should be steered for the Island Busheab, taking care in the night, or in hazy weather, to avoid the reef off its western extremity: when abreast of this island, she ought to steer to pass to the southward of Kaez, then between Polior and Nobfleur Islands, and on the north side of the Tumbs; then to the E.N. Eastward, passing Angaum Island at a moderate distance, and afterwards for Cape Koli, rounding the Quoins at a convenient distance, according to the prevailing wind; but it is prudent to pass them at a considerable distance, as the currents are strong, and the water too deep near these islands and Cape Moosendom for anchorage. *To proceed down the Persian Gulf.*

In passing out of the entrance of the gulf, the Persian shore between lat. 26° N. and Cape Jask, ought not to be approached nearer than 30 fathoms in the night, nor under 20 fathoms in the day, on account of Kohumbarek Shoal projecting 2 or 3 miles from the coast, and situated about 5 or 6 miles W.N.W. of the Cape.

DURING THE NORTHERLY MONSOON, from September to April, ships leaving the Persian Gulf, should, if bound to Surat, Bombay, or other northern ports on the Malabar coast, steer from Cape Jask along the coast, keeping at a considerable distance from it, to avoid light winds or calms, occasioned by land or sea breezes near the shore. *Passage during the Northerly monsoon.*

When the meridian of Cape Mooarree is approached, it will be proper to steer to the S. Eastward, and cross the Gulf of Cutch, then pass the Guzarat Coast at any convenient distance. Having passed Diu Head at the distance of 12 or 14 leagues, a direct course may be steered for Bombay if bound there, or towards the high land of St. John, when bound to Surat.

Ships bound to the southern parts of the Malabar Coast, or other ports, in the Bay of Bengal, or farther eastward, should proceed from Cape Jask, nearly as directed above; it is not necessary that they approach the Gwadel and Guzarat coasts, so close as vessels bound to Bombay or Surat; but they ought to keep so far to the northward, as to enable them with N.E. or N.N.E. winds, to make the high land about Barsalore, and pass inside the Laccadiva Islands.

During the strength of the northerly monsoon, a passage may generally be made from Basra in 26 or 28 days to Bombay, and from Muscat in 10 or 12 days.

Passage during the S. W. monsoon.

DURING THE S. W. MONSOON, the egress from the Persian Gulf is equally favourable. From March to September, vessels leaving the entrance of the gulf, if bound to the Bay of Bengal, or eastern parts of India, may steer a course to pass to the westward of the Laccadiva Islands, then through either of the channels between them and the Maldivas; or they may steer to pass inside the former islands, and along the edge of soundings on the Malabar Coast to Cape Comorin. When circumstances permit, the track to the westward of the islands seems preferable, for there the monsoon generally blows steady without rain, but inside the islands, near the coast, hard squalls, with rain and cloudy weather, may be expected during the whole of the S.W. monsoon.

A ship bound to Bombay in this season ought to get into the latitude of the Island of Kundaree, at the distance of 30 or 40 leagues from the land, then steer directly East on its parallel for the entrance of the harbour. In this monsoon, few other ports on the coast are frequented by ships, most of them being open roads, unsafe, and exposed to the high sea that rolls in upon the shore. A passage from Muscat to Bombay may be made in 7 or 8 days in this monsoon.

Surat Road is very unsafe when the S.W. winds are in force, therefore ships bound to this port do not depart from the Persian Gulf until the beginning of September; at this time a course may be steered to pass Diu Head about 12 or 13 leagues distant, taking care to keep a considerable distance from the Gwadel Coast. Variable westerly winds, with occasional calms, may be expected, and on approaching the Guzarat Coast, showers of rain. When abreast of Diu Head, a ship should get on the parallel of 20° N. and then steer East for the high land of St. John, taking care not to get too far North towards the banks. The coast about St. John should not be approached under 10 or 12 fathoms in the day, or 13 fathoms in the night, and the reef and foul ground project above 2 leagues from the shore and have 10 fathoms close to. Having made the land, a course should be steered along shore for Surat Road, not coming under 11 or 12 fathoms, till abreast of Demaun; from whence to Surat River the coast may be approached to 7 fathoms at high water, or to 4½ or 5 at low water spring tides.

# APPROACHING BOMBAY HARBOUR IN THE SOUTH-WEST MONSOON.

A SHIP steering for Bombay Harbour, from the middle of May till August, may sometimes have steady gales and clear weather, until she get within 25 or 30 leagues of the coast; but cloudy weather, with rain and squalls, may be expected on the bank of soundings, as she advances near the land. In June and July, more particularly when the S.W. monsoon blows in full force, such weather is frequently experienced, precluding observations; she ought, therefore, to have good topsails and courses bent, that she may haul off and keep at a reasonable distance from the land, in case dark blowing weather should prevent the latitude from being correctly ascertained; for in dark stormy weather, it would be imprudent to run for the harbour, if the latitude is not obtained by observation of sun, moon, or stars.

State of weather off Bombay Harbour in the S.W. monsoon.

When a ship has obtained soundings in the S.W. monsoon on the edge of the bank, large snakes will be perceived if a look-out is kept for them; these diminish in size, as the depths on the banks decrease, in running towards the land. If not exactly certain of the latitude, it will be prudent to keep in from 18° 20′ N. to 18° 30′ N., and endeavour to get soundings on DIRECTION BANK to S. Westward of Kundaree Island, for a guide, which has on it from 22 to 28 fathoms, coarse sand and small shells, with 30 and 32 fathoms mud within it. But on the parallel of Kundaree, the soundings decrease very regularly in steering to the eastward.

Snakes are seen when in soundings.

During the early part and strength of the S.W. monsoon, great care must be observed not to get to the northward of the entrance of the harbour, for then the current frequently sets along the bank toward the Gulf of Cambay; and if a ship get to the northward of the harbour late in May, June, and July, she may find it very difficult at times, if not impossible, to work round the S.W. prong.*

Dangerous to get to the northward of the harbour.

Therefore, in these months, a ship should steer direct for Kundaree Island, allowing for a northerly set, and endeavour to make it bearing between East and S.E., taking care to borrow a little either way as prudence may dictate and circumstances require, to carry a fair wind in entering the harbour. If the wind incline to blow in squalls from West or W. N.W., take care not to run too close in with the land to the southward of Kundaree Island, nor even approach that island too near on account of the

* By getting to the northward of the harbour in June, several ships have been driven on shore in Back Bay; the Shah Byramgore, in a heavy gale that set in after she had worked out of the harbour, was forced to the northward of it, driven on the rocks near Versavah, where most of the crew perished, and the ship was wrecked. Other ships have been in distress, and with great exertions got round the Prong, into the harbour. An American ship, bound to Bengal, had a narrow escape; having experienced strong easterly currents, she fell in with the high land of St. John, *when near Point Palmiras*, in the Bay of Bengal, by dead reckoning. This happened when the S.W. monsoon was blowing strong, late in June. Being a fast-sailing ship, she cleared the shore under a press of canvass, passed Bombay, stood to the southward, and arrived safe at Madras.

flat, as there might be difficulty in weathering it with these winds, which are sometimes experienced in June and July, but more expected in August. In August and September, the squalls come mostly from West and W. N.W., and the freshes from the rivers and Gulf of Cambay set to the southward; it is, therefore, not so dangerous at this late period of the season to get to the northward of the entrance of the harbour, although it is still prudent to fall in with Kundaree Island bearing to the southward of East, that no time be lost in entering the harbour.

Period of the setting in of stormy weather.

It has been observed at Bombay, that the first stormy weather of the S.W. monsoon seldom comes with the full moon springs, but generally during the dark nights. Although southerly winds prevail greatly after the middle of May, the stormy weather and rain usually do not set in until the dark nights, some time between the 4th and 15th of June. From the 8th of this month to the 15th or 20th of July, the weather is generally most unsettled and severe; hard squalls, much rain, and dark cloudy weather, may then be frequently expected in the vicinity of Bombay Harbour.

# BOMBAY HARBOUR.

General description of Bombay Harbour.

BOMBAY HARBOUR is very capacious, being 12 or 14 miles long from North to South, with a general width of from 4 to 6 miles. Its shores are irregular and indented by various bays and inlets, and it contains several islands and banks.

The usual anchorage is on the west side of the harbour off the town of Bombay, which stands on the S.E. point of Bombay Island. The unhealthiness of this spot, arising from the swampy nature of the country, would have been sufficient to have driven away the first European colonists, had not its commanding position for commerce and its commodious harbour pointed it out as of all others in India the most eligible for the formation of an important settlement. Bombay Harbour possesses too the peculiar advantage of a sufficient ebb and flow of tide for the construction of wet docks, a circumstance which has added very much to its importance and celebrity.

The general depths in approaching Bombay Harbour are from 14 to 8 fathoms; there are 6 and 7 fathoms in the entrance, and less as you proceed towards the head of the harbour.

## ISLANDS AND REMARKABLE HILLS.

Lighthouse Island.

Lighthouse Island, which forms the northern entrance point of the harbour, is low, with a small elevation at the south end, on which the lighthouse stands, in lat. 18° 53′ 45″ N., bearing S.W. by S. from Bombay Castle, distant $2\frac{1}{2}$ miles; it is kept white, and the lantern being 130 feet above the level of the sea, may be seen at a considerable distance in clear weather; but it is generally hazy about the entrance of Bombay Harbour. The island is separated into two parts by a small causeway, covered by the sea on spring tides; the southern part where the lighthouse stands, is usually called Colabah, and the smaller part to the northward, where Broughton Grove is situated, is called

Old Woman Island. In April, 1803, the variation at the lighthouse was 0° 50′ W., having altered little during 30 or 40 years, which is the case in most parts of the seas of India.

Bombay Island lies immediately north of Old Woman Island, and is joined to it by a cause-way which is overflowed at high water. It is about 8 miles long from North to South, and about 3 miles broad. It is formed by two ranges of rock of unequal lengths running parallel to each other on opposite sides of the island, and their ranges are united at their extremities by hills of sandstone which are only a few feet above the level of the sea. The interior of the island was formerly liable to be overflowed by the sea, which is now prevented by substantial works and embankments. The lower parts of the island are, however, still subject to the influence of the heavy rains which in their season reduces them to a swamp, so that during the continuance of the rainy monsoon the houses are separated from each other by water, sometimes for several months. Bombay Island, in coming from seaward, appears very low, excepting Malabar Hill, which is of middling height, having a regular oblong appearance, sloping a little toward the sea, and is covered with trees; among these, some white buildings are interspersed, with a signal-post and flag-staff at the point near Mazagon Hill, situated to the northward of Bombay Town, is of middling height, not easily known until well up the harbour. Parell Hill, farther northward, is a round mount having on it a flag-staff; but this, and an oblong hill near it, covered with trees, are not perceived till far up the harbour:—Suree Fort is on a point of land near these hills.

Bombay Island.

Mazagon, and other Hills.

Suree Fort.

The Town of Bombay is well fortified. Being essentially a commercial port, its population varies considerably, and consists of Persians, Arabs, Mahrattas, Carnatas, Portuguese, Indians, from Goa, and a great number of sailors of all nations. The entire floating population has been estimated at 229,000 souls.

Town of Bombay.

The Docks, which are the property of the East India Company, are under the management of Parsees, by whom the ship-building is conducted. The ships built at Bombay include merchant vessels of very large tonnage, occasionally frigates and even ships of the line, the timber being amply supplied from the neighbouring districts of Malabar and Guzerat.

The North-east bastion of Bombay Castle is the most prominent angle of the works towards the sea. When abreast of the Sunken Rock Shoal, coming up the harbour, this bastion is not easily distinguished from the wall of Fort George, which is on higher ground a little farther northward.

Bombay Castle.

The flagstaff, on the S.E. bastion of the Castle, I made in lat. 18° 55′ 48″ N., lon. 72° 57′ 40″ E. of Greenwich, by means of ten immersions and emersions of Jupiter's 1st and 2nd satellites, observed in January, February, March, and April, 1803, by adopting M. D. Lambre's computation for Greenwich mean time; corroborated by numerous chronometric and lunar observations, taken by various navigators. Captain Basil Hall, of the Royal Navy, made it 7 miles more to the West, by three eclipses of Jupiter's 1st satellite, in 1814, or in lon. 72° 50½′ E. Mr. Goldingham, the astronomer at Madras, made the observatory there in lon. 80° 17′ 21″ E., which by his chronometric measurement from thence, 7° 23′ 18″ W., would place Bombay old church in lon. 72° 54′ 33″ E. By upwards of 30 eclipses of Jupiter's satellites, the same astronomer made the church in lon. 72° 54′ 20″ E., and by mean of 160 lunar observations, he made it in lon. 72° 58′ 41″ E., error in the tables at that time 2′ 55″, 5 too much, which deducted, made the church in lon. 72° 55′ 45″ 5 E. Lieutenant Raper, in his Discussions of the Longitudes, adopts 80° 14′ 0″ E. as the longitude of Madras Observatory, and 7° 23′ 56″ as the difference between that observatory and Bombay old church, thus placing the

The Flagstaff.

Position of the Observatory.

latter in 72° 50′ 4″ E. In the Hydrographic-office of the East India House, the flag-staff at Bombay is considered to be in lon. 72° 54′ 42″ E.

Cross Island.

CROSS ISLAND is a small island resembling a hay-cock, and lies about $1\frac{1}{4}$ miles to the northward of the anchorage off the town, and 3 quarters of a mile from the nearest part of the shore. A shoal projects half a mile from it to the S.W., but there is a narrow passage inside between this shoal and the bank which lines the main shore.

Derdewee Island.

DERDEWEE or BUTCHER ISLAND is larger than Cross Island, and lies E.N.E. $\frac{1}{2}$ E. about 3 miles from it. It has a tower on it near the centre, and several other buildings, and a large tree near its S.E. end, which is used as a leading mark when in one with Trombay old church for passing inside the Thull Shoal.

Elephanta Island.

ELEPHANTA or GARAPOREE ISLAND, about 2 miles south-eastward from the point of the Neat's Tongue, and one mile East from Butcher Island, has a peak on its western side : it is the *first* isolated piece of high land seen to the right of the Neat's Tongue, in approaching the harbour from the south-west or westward.

Caranja Island.

CARANJA, or CARRIJA ISLAND, to the southward of Elephanta, on the east side of the harbour and opposite its entrance, is of considerable extent, being 4 miles long and nearly 2 broad, and is low and woody, except two remarkable hills, called Great and Little Caranja Hills. Caranja Little Hill, on the north part of the island, has an irregular outline, about the same height as Elephanta, resembling it when seen from seaward ; and is the *second* piece of isolated high land seen to the right of the Neat's Tongue. Caranja Great Hill, near the south part of the island, is very conspicuous, being a little convex, of tabular form, with a steep declivity at each end, called the north and south brows of the hill. On the north brow, there is a small knob, with the ruins of a building; which, except when near it, is not perceived. This hill is the *third* piece of isolated high land seen to the right of the Neat's Tongue.

Thull.

THULL, or TULL HIGH LAND, forms the southern boundary of Bombay Harbour, and is the next high land in succession to the southward or right hand, seen in coming from the westward. The opening between this and Caranja Great Hill leads into Penn River. There is a hill near the south entrance point of the harbour called Thull Knob, and $3\frac{1}{2}$ miles S.E. by E. of it two peaks called the Paps. The Knob and Northern Pap in one forms a leading mark in entering to pass to the northward of Thull Shoal.

Gull Island.

GULL ISLAND is a large rock mid-way between the centre of Caranja Island and Thull Knob, in the channel between them which leads to the entrance of Penn River.

Ondaree and Kundaree Islands.

ONDAREE and KUNDAREE, are two islands outside the harbour lying near the shore on the south side of the entrance.

Ondaree is about a mile from the main land opposite to the village of Thull. It is very low, and is fortified by a wall which surrounds it.

Kundaree lies $1\frac{1}{2}$ miles W.S.W. from the island just described; it is higher than it, and, though small, is covered with trees and houses, and is surrounded by a fortified wall. Having the high land of Thull behind it, it is not easily perceived from seaward. It is just discernible from the decks of the ships in Bombay harbour when they are elevated by the tide at high water. It is on the meridian of the lighthouse, from which it is distant 11 miles. Large ships should not borrow too near Kundaree in the S.W. Monsoon, as a flat projects from it several miles to seaward, over which a heavy ground swell rises, which is liable to make ships labour very much.

## DANGERS, WITH MARKS TO AVOID THEM.

THULL SHOALS may be considered, during the S.W. monsoon, the greatest danger in the entrance of the harbour, to ships at a great draught of water. Thull Shoals.

It is generally composed of rocky bottom in patches, with large gaps of soft ground between them; particularly within the outermost patches, there is a gap or channel of deep water and soft ground, extending N. N. E. and S. S.W., which is wide at the northern part. The Surat Castle struck on one of the outer patches of rocks, lost her rudder, and narrowly escaped being wrecked, by the high sea lifting her over it into the gap of soft ground inside, where there are 1 and 2 fathoms more water than on the outermost rocky patches.

The outermost part of rocky ground, on which are only from $3\frac{1}{4}$ to $3\frac{3}{4}$ fathoms at low water spring tides, lies 3 miles W. N.W. from the nearest shore of Thull: and a direct line South from the lighthouse, just clears, but nearly touches the western edge of the outermost patch of rocky ground.

For avoiding the dangers in the entrance of the harbour, the round hill called Thull Knob, is useful as a mark in thick weather; it being near Thull Point, and detached from the more distant land.

To avoid the foul ground.

With Thull Knob bearing between E. $\frac{1}{4}$ N., and E. by S., the foul ground is very dangerous, for the rocky patches project farthest out with this bearing, and the depth of water decreases very little near them. With such bearing of the Knob, approach no nearer the foul ground than to bring Kundaree Island S. $\frac{1}{2}$ E., or the lighthouse N. $\frac{1}{2}$ E.; or keep the latter a little open to the eastward of all Malabar Hill, until the large rock, called Gull Island, in the channel leading to the entrance of Penn River, is about half a point open to the southward of the low woody south point of Caranja, near the Great Hill, or until the south brow of this hill bear E. by N.; you are then to the northward of the extremity of Thull Reef. With Gull Island very little open, or touching the low woody south point of Caranja when the lighthouse bears N. $\frac{1}{2}$ W., or is a little shut in with the eastern part of Malabar Hill, you are on the northern point of the foul ground, where $5\frac{1}{2}$ fathoms rocky bottom is the least water at low spring tides. There is no danger in the fair season by borrowing a little upon this point of the foul ground, from 4 to 5 fathoms hard ground, being the smallest depths at low water; but do not shut Gull Island far in upon the low woody point of Caranja. Several ships have passed through the gaps or channels inside the rocky patches in the fair season without knowing it; and there is depth at half tide on them sufficient for a ship when the sea is smooth; but in the S.W. monsoon, the high sea that rolls in towards Thull seems sometimes ready to break on the outermost rocky patches of the foul ground. In Lieut. Cogan's chart of Bombay Harbour, there is a clear passage of 5 and $5\frac{1}{2}$ fathoms between the outer and inner Thull Shoals, the leading mark through it being the large tree on the east part of Butcher Island and Trombay old church in one.

CARANJA SHOAL is an extensive bank on the eastern side of the harbour, projecting 3 miles from Caranja Island to the westward. The south-western edge of it bears from Thull Knob about N. N.W., from the south brow of Caranja Great Hill about West, and is distant from Gull Island nearly 2 miles to the north-westward; the westernmost point of the shoal lies nearly mid-way between Gull Island and Oyster Rock, and bears S. E. by E. $\frac{1}{2}$ E. from the lighthouse, distant 3 miles. Caranja Shoal.

The north part of this shoal opposite to the Little Caranja Hill, is steep and rocky in some places; but the south part of it abreast the Great Hill is more even, composed of hard sand, and not so steep as abreast the little Hill. The S.E. point of the Neat's Tongue open with the N.W. end of Butcher Island, or according to Lieut. Cogan's chart, the Tower on Butcher Island and Trombay old church in one, leads clear to the westward of the edge of this shoal. On the southern edge of the shoal, abreast the Great Hill, a ship may in fine weather borrow to have a hard or shoal cast in working, when certain of not missing stays; but should tack on getting the first cast of hard soundings, particularly in a large ship, and near low water.

S.W. Prong, and mouth of the harbour.

South-west Prong, or S.W. extremity of the reef which surrounds Old Woman Island, forms the northern boundary of the entrance into the harbour, and Thull Reef the southern; the breadth of the channel between them is about 2 miles. The extreme point of the S.W. Prong, is distant nearly 3 miles from the lighthouse, bearing S. 36° W.; for a line drawn from the extremity of the Prong N. 36° E., passes through the lighthouse, through Broughton Grove, through the Flagstaff of Bombay Castle, and touching the inner part of Cross Island, passes to the central part of the Neat's Tongue, making a transit with all these places. From Malabar Point the extremity of the Prong bears S. $\frac{3}{4}$ W., distant 5 miles.

Directions for rounding the Prongs.

The S.W. Prong consists of sharp rocks, and being steep, the soundings give no warning near it. At low water spring tides, the rocks appear above the surface to a considerable distance from the lighthouse, and when the sea runs high in the S.W. monsoon, heavy breakers appear far out upon the Prong at low water, but not to its extreme point. For rounding this Prong, and entering the harbour, a good mark in clear weather is the Funnel Hill (remarkable by a rock on it resembling a chimney, and situated behind Caranja Island, about 18 miles eastward from Bombay Castle), kept just open, or touching the north brow of Caranja Great Hill, or that part of the hill E. 7° N., until the Oyster Rock is brought on with the flagstaff of Bombay Castle; you may then begin to haul to the N. Eastward round the reef, drawing the Oyster Rock as far in upon the town as the court-house, or largest building, by the time the lighthouse is brought to bear North, or N. $\frac{1}{2}$ W. By the time it bears N.N.W. the Oyster Rock should be brought on with the old church square steeple; steer then well to the Eastward to pass clear of the Sunken Rock Shoal, by bringing Mazagon House or Hill, rather more than half a point open to the Eastward of the outer bastion of Bombay Castle. This mark continued, will carry a ship clear to the eastward of the Sunken Rock Shoal, and of the Dolphin Reef, and to the westward of the Middle Ground, among the shipping in the harbour.

On the northern declivity of the high land of Thull, there are near each other two small hummocks, called the Paps, but they are not very conspicuous; when the Funnel Hill is not seen, Thull Knob, on with the *northernmost* of the two Paps, is a safe but close mark, in passing the extreme point of the Prong. Do not bring the Knob of Thull to the southward of this northern Pap, for if brought between the Paps, you will pass over the extreme point of the Prong, where a large ship may strike on the rocks at low water if there is any swell.

When the lighthouse bears N.N.E., there is a gap or basin in the reef with soft bottom, and the same depths of water as in the channel. This gap separates the outer part of the reef, or *South-west Prong*, from the eastern part, generally called the *South-east Prong*, which commences when the lighthouse bears about N. by E. $\frac{1}{2}$ E., extending nearly in a N.E. direction to the Sunken Rock Shoal. This part of the reef is also rocky, with some small gaps of soft ground and deep water on its outer edge,

when the lighthouse bears from N. ½ W. to N. by E. There are several small holes, or places of soft ground and deep water, well in upon the reef, having 3¼ or 4 fathoms rocky bottom much farther out, toward its exterior edge.

The soundings near the eastern part of the reef, like those close to the South-west Prong, are soft mud, but are no guide in the approach toward it; the depths being nearly the same in mid-channel as close to the reefs, or not more than half a fathom difference: there is rather less depth near the edge of the foul ground off Thull than towards the reef off Old Woman Island.

Having so far entered the harbour as to have the lighthouse N. ¾ W. or N. by W., the reef projecting round Old Woman Island is not so steep and dangerous as it is farther out: for the hard rocky bottom is then more even, and a ship not drawing much water, might venture to get a hard cast on it, when the lighthouse is more westerly than N. ½ W., and the tide flowing fast; but if near low water, with any swell, it would be imprudent to borrow on the edge of the reef in any part.*

A Spire Buoy, or Fairway Buoy, has been placed in the entrance of the harbour, to guide ships into the fair channel during the S.W. monsoon, when pilots are prevented from getting out beyond the reefs on the flood-tide. This buoy is placed between Thull Reef and the Prongs, in 6½ fathoms at low water spring tides, and 9½ fathoms at high water, distant from the nearest part of Thull Reef 1½ miles, and from the nearest part of the lighthouse Prongs, 3 quarters of a mile. Kundaree Island bears from it S. ¾ E.; the lighthouse on Old Woman Island N. by E.; Thull Knob, S.E. by E. ½ E., a ship's length open to the northward of the northernmost Pap on the Highland of Thull; Funnel Hill on the back land E. ½ N., well shut in with the north part of Caranja Great Hill; Sunken Rock Floating Light Vessel (or Buoy in her place in the fair season), N.E. ½ N., on with the eastern part of Butcher Island; Oyster Rock Beacon, erected of stone and lime, 24 feet in height, N.N.E. ½ E., a little open to the eastward of Cross Island. Spire Buoy.

Entering the harbour without a pilot, pass at a small distance to the southward of the Spire Buoy, then steer N.E., N.E. by N., and N.N.E. if it be flood tide; but if it be ebb tide, steer E.N.E., N.E. by E., and N.E. to avoid the South-East Prong, and afterward be careful to pass outside, or to the eastward of the Sunken Rock Vessel, or Buoy, and then wait for a pilot.

Sunken Rock Shoal, is nearly half a mile in length East and West, and nearly 2 cables' lengths in breadth at the widest part, consisting of hard uneven ground, 2 and 3 fathoms on it at low water springs. On the outer edge to the eastward, there is a large rock on which the sea sometimes breaks, when near low water in the S.W. monsoon; and the top of the rock is visible sometimes when the tide is very low on the springs. A buoy is in general placed near it on the outside, or upon it, and a pilot vessel stationed there in the S.W. monsoon. The buoy, placed at a small distance outside of it, bears from the lighthouse S. 68° E. 1⅓ miles. From this outer rock, the shoal has been called the Sunken Rock, though it is properly a considerable shoal, having another rocky place, of 1½ and 2 fathoms at low water, on the inner part of it, about half a mile from the former. Between them, the depths on the shoal are 2, 3, Sunken Rock Shoal.

* The Flagstaff of Bombay Castle open to the eastward of the Oyster Rock (Mr. Nichelson's mark for passing clear of the S. E. Prong, or eastern part of the Reef) is too close; for several ships deeply laden have, in running along the edge of the Reef, struck on it about low water, with this mark on. The Oyster Rock being situated near Old Woman Island, and a small part of it only visible above water at high tides, is not easily discerned by a stranger till well within the entrance of the harbour; but lately a stone beacon has been placed on it.

and $3\frac{1}{2}$ fathoms at low water, generally hard ground; and the inner part of this shoal joins to the upper end of the reef projecting from Old Woman Island, which makes the passage inside the Sunken Rock Shoal unsafe, except for small vessels.

Marks for clearing the Sunken Rock Shoal.

The northernmost tomb on Old Woman Island, in one with the south part of the Oyster Rock, leads clear to the northward, or above the Sunken Rock Shoal.

Malabar Point open to the southern of the southernmost grove of trees on Old Woman Island, leads clear to the southward of the Sunken Rock Shoal. Mazagon Hill half a point open with the outer bastion of the castle, leads clear to the eastward of this shoal.

Dolphin Reef.

DOLPHIN REEF is a rocky shoal projecting from Broughton Grove, which is a large plantation of brab trees on the N.E. part of Old Woman Island; on the inner part of this reef, near the shore, the rocks at low water springs are dry. Mazagon House, a little open with the outer bastion of Bombay Castle, leads on its edge, but half a point open leads clear of it. When Malabar Point is on with the gut between Old Woman Island, and the low sandy south point of Bombay, called Mendam Point, you are clear to the northward of it; and Malabar Point a little open to the southward of Broughton Grove is clear to the southward of this reef.

Apollo Spit.

APOLLO SPIT, projecting from the saluting battery to a considerable distance, is hard and stony, but not dangerous; ships moor clear of it, to prevent grounding, or rubbing their cables. When on the outer point of this spit, the guard-house over the Apollo gate is between the small turret and the bushy tree on the ramparts, and Mazagon House a little open with the outer bastion of Bombay Castle.

Middle Ground Shoal.

Marks for passing it.

MIDDLE GROUND SHOAL, is steep all round; on the S.E. side, it is a steep wall of rocks, the sea nearly breaking on it at low water spring tides, when blowing hard, there being only 3 and 4 feet on the shoalest places at these times. Suree Fort just touching the west point of Cross Island, leads clear inside or to the westward of the Middle Ground. The Oblong Woody Hill (close to the northward of Parell Hill), a little more than half shut in with the west end of Cross Island, leads clear to the eastward or outside the Middle Ground:—or another mark to pass outside of it, is the sandy beach to the southward of Suree Fort, all open to the eastward of Cross Island. When clear to the northward of this shoal, the church steeple is on with the Bunder Gate; and Malabar Point on with the sandy point of Bombay Island, is clear of it to the southward.

Flagstaff Shoal.

FLAGSTAFF SHOAL consists of rocky bottom, the depths on its shoalest parts being about 14 feet at low water spring tides. Between this and the two last-mentioned shoals, is the space where ships generally moor, abreast the town, in 4 and 5 fathoms at low water, soft mud.

Marks for the Flagstaff Shoal.

The old church steeple and flagstaff in one, and Mazagon ruined fort or black tower on with the gap between Parell Hill and the Oblong Woody Hill, is on the centre of Flagstaff shoal; but Mazagon ruined fort on with the centre, or rather nearer the gap than the centre of the Oblong Woody Hill, leads clear inside of it; and Mazagon ruined fort on with the centre of Parell Hill leads clear of it on the outside. When clear to the northward of it, the old church steeple is a little open to the southward of the single brab tree on the castle; and when to the southward of it, the flagstaff on the castle is a little more than half-way from the steeple toward the single brab tree.

## TIDES, SOUNDINGS, &c.

It is requisite for every person sailing in or out of Bombay Harbour, to remember that the tides rise and fall from 14 to 17 feet on the springs, and 10 or 12 feet perpendicular at the quadratures. Tides.

At low water spring tides, the depths close to the S.W. Prong, and round the edge of the reef extending from Old Woman Island, are $6\frac{1}{2}$ and 7 fathoms, and 9 or $9\frac{1}{2}$ fathoms at high water.

Depths near the Reefs. The depths close to the N.W. extremity of Thull Reef, are about half a fathom less than near the Prongs, and in mid-channel, about half a fathom more than near them.

Depths in the fair channel. With the lighthouse bearing North or N. by W., the depth at low water spring tides is $7\frac{1}{4}$ or $7\frac{1}{2}$ fathoms in the fair channel between the reefs, which shoals gradually in proceeding up the harbour, to $6\frac{1}{4}$ and $6\frac{1}{2}$ fathoms abreast the Sunken Rock Shoal, and to 5 or $5\frac{1}{2}$ fathoms near the Middle Ground Shoal: but *marks* and not *soundings* must be the principal guide, both in the entrance and within the harbour.

Quality of bottom. Except upon the reefs or shoals, the bottom is proper for anchorage throughout the harbour, being soft mud or clay. Velocity and direction of the tides. The velocity of strong spring tides between Thull Reef and the Prongs is $2\frac{1}{2}$ or $2\frac{3}{4}$ miles per hour, abreast the shipping outside the Middle Ground Shoal nearly the same, but not so strong where they moor. In the entrance of the harbour the tide does not set fair through the channel, but the flood slants over the extremity of the foul ground off Thull to the eastward, towards the opening leading to Penn River. And during the rains in the S.W. monsoon, the ebb sets strong out of that river to the westward, which greatly assists ships in working out of the harbour; but it is only on the springs that the outsets from the rivers are strong. Time of high water. At the Dock Head, and where the ships moor, it is high water at a few minutes past 11 o'clock, on full and change of moon; and about three quarters of an hour later below the Sunken Rock Shoal, in the entrance of the harbour.*

Back Bay. The breadth of Back Bay, formed between Malabar Point and the lighthouse, is near 3 miles; the water all over it is shoal, with reefs of rocks partly dry at low water, but there is a small channel for boats along the north side of it, close under Malabar Hill. This bay might *possibly* be mistaken for the entrance of the harbour, by persons unacquainted, falling in with the land to the northward in thick weather, when the lighthouse or other marks are not discernible.

Soundings off the entrance of the harbour. West of Kundaree Island, the depths are 7 fathoms at low water 5 miles from it, 14 fathoms about 10 miles, 30 fathoms about 20 miles, 40 fathoms about 11 leagues from it; and 40 leagues west from this island, the depth of water is only increased to 50 fathoms, so flat is the bank on the parallel of the entrance of the harbour.

An extensive flat surrounds Kundaree, with only 4 to 5 fathoms on it at the distance of 2 and $2\frac{1}{2}$ miles from that island, having a heavy ground swell rolling upon it in the

* In December and January, when the sun is near the southern tropic, there is on the springs nearly 2 feet more rise of tide in the night than in the day; but in June and July, when the sun has great north declination, the day tides are highest. In the foul weather season, ships are therefore moved in and out of dock with daylight; but ships drawing much water must in the former months be transported in and out of dock on the night tides. The docks at present can receive 5 ships of the line, and are well constructed. There is another at Mazagon for small ships. This phenomenon, of the inequality of night and day tides, in the different seasons, is also experienced on the Guzarat and Gwadel Coasts, and apparently on the South Coast of China, and in some other places of the Eastern Seas.

S.W. monsoon, at which time ships ought not to approach the island nearer than 4 or 5 miles, nor under $6\frac{1}{2}$ or 7 fathoms, if possible.

Soundings to the northward of S.W. Prong.

It has been observed, that the extremity of S.W. Prong is steep to, and the soundings near it, no guide; but to the northward of the Prong, when the Peak of Elephanta is shut in with the lighthouse, the depth decreases gradually on the edge of the hard ground that projects from the rocky ledges of Back Bay to seaward.

## DIRECTIONS FOR ENTERING THE HARBOUR.

Directions.

To refer to all the marks for avoiding the shoals, previously given in describing them, may often be difficult when ships are running speedily into the harbour, with a strong wind and flood tide; the following directions, therefore, may be readily comprehended to guide the navigator, as the pilots cannot reach a ship in the S.W. monsoon, until she has well entered the harbour.

If a ship, in working out, meet with severe weather, split her sails, or sustain any accident in the night, so as to force her to return; or if approaching the harbour from sea, with a fair wind for running into it during the S.W. monsoon, it will be prudent, if the Island of Kundaree is seen, and not the light, to keep it well to the S. Eastward until the latter is visible. If the wind is southerly, do not bring Kundaree to the southward of S. $\frac{1}{2}$ E.: if westerly, or baffling, with a swell rolling in toward Thull, do not bring it to the southward of at most S. by E. until the light is seen, or in shoaling haul to the N.N. Westward, as Kundaree Flat extends far out to seaward, and joins also to the S.W. part of the foul ground off Thull. In standing toward this flat, the depth decreases gradually, and increases in standing from it about N.N.W. toward the S.W. Prong. When the light is seen, let it be the principal guide. Should the wind be far to the westward, or baffling, with a heavy swell rolling in upon Thull, run into the entrance of the harbour, keeping the light N.N.E. to N.N.E. $\frac{1}{2}$ E. until the S.W. Prong is judged to be near, then edge away to the Eastward. The lighthouse N.N.E. $\frac{1}{2}$ E. leads a ship within the extreme point of the S.W. Prong: when bearing N.N.E., it is on with the large gap of the reef between the Prongs. If the wind prevail brisk at S. Westward, bring the light N. by E. or N. by E. $\frac{1}{2}$ E., and run in with these bearings, which will carry a ship fairly into the entrance of the harbour, about mid-channel between the extremity of the S.W. Prong and the edge of Thull Reef. When thus far advanced, if the night is not very dark, Caranja Great Hill will be seen, known by its bold and even shape, and by the bearing. When its south brow bears E. by N. $\frac{1}{2}$ N. it is in one with the northern extremity of the foul ground off Thull, where the smallest depth is $5\frac{1}{2}$ fathoms at low water with this bearing. When the south brow of this hill bears E. by N. you are to the northward of all Thull foul ground, and ought to edge over to the eastward, to give a berth to the southern part of the reef off Lighthouse Island.

When running in with the light N. by E. to N.N.E.,* if the night is dark, and Caranja Great Hill not discernible, it may be difficult to know when you are to the northward of Thull foul ground, and approaching the southern edges of the Prongs; in this case much attention is requisite, as it must depend on judgment. The northern part of Thull foul ground, where there is any danger, is distant from the lighthouse upwards of 5 miles; whereas the edges of the Prongs are only 2 and $2\frac{1}{4}$ miles from it

* Care must be taken not to mistake any of the casual lights of the military cantonments on Old Woman Island, for that of the lighthouse; although, with common attention, this cannot probably ever happen.

when it bears N. by E. or N. by E. ½ E.: the light may therefore be useful at times as a guide, by attending to its brilliancy and appearance, to judge from what side of the channel it is seen.

The south brow of Caranja Great Hill is in one with the outer edge of the Prongs when bearing E. ¼ S.; and as it bears E. by N. ½ N. from the northern extreme of Thull foul ground, this narrow part of the channel is comprehended between these bearings.

Running in under easy sail, with the light bearing N. by E. to N. by E. ½ E., if Caranja Great Hill is not discernible, and you judge yourself to be to the northward of Thull Reef, and approaching the south part of the Prongs, by the appearance of the light or otherwise, edge immediately well over to the eastward until it is brought to bear N. by W., or N.N.W., you will then be above the Prongs and most dangerous parts of the reef. Should you be deceived in estimating the distance from the light, and have a hard cast on the edge of the reef with the light N. by E., or N. by E. ½ E., haul out instantly to the S. Eastward, it being steep to, with deep gaps, from 6½ fathoms soft, to 3¾ or 4 fathoms rocky ground at low water, with these bearings. On the other hand, should you have edged to the eastward before being clear to the northward of Thull Reef, and get hard or irregular soundings on it, haul to the N. Westward a little, till in the fair channel.

Having passed inside of Thull Reef and the Prongs as directed, and the light bearing N. by W., or N.N.W., you are then fairly entered into the harbour, and may steer N.E. to N.E. by E., until the light is brought to bear W.N.W. When it bears from W. N.W. to W. by N. you are abreast the Sunken Rock Shoal, and should edge well over to the eastward towards Caranja Shoal, to give the former a wide berth; when the light bears W. by N. you are above it, and may haul directly to the westward, and anchor with the light any way between W. by N. and W. S.W., which are fair bearings betwixt the Sunken Rock and Middle Ground Shoals. If the night is dark, to prevent running too close to the Oyster Rock under Old Woman Island, or too near the Middle Ground Shoal, anchor with the light bearing from W. by N. to W. by S.

If a ship in edging to the eastward to give a wide berth to the Sunken Rock Shoal, get so far over as to have a shoal or hard cast on the edge of Caranja Shoal, there is no danger if she haul directly off to regain the fair channel in the western side of the harbour, for this shoal is not here so steep as it is farther up abreast of Caranja Little Hill, opposite to the Town of Bombay. With the wind at West or W. by N., it will not be prudent to make free with the eastern side of the harbour, either towards Thull Reef or Caranja Shoal.

## DIRECTIONS FOR WORKING INTO THE HARBOUR DURING THE NIGHT, IN CLEAR WEATHER.

When the sky is clear in the night during the fair weather season, persons a little acquainted, to save time, may work into the harbour with the land wind and flood tide, after Kundaree, or the light on Old Woman Island, is discerned. Work towards the entrance of the harbour, traversing with the light when seen from N. ½ E., to N.N.E. ½ E., until the south brow of Caranja Great Hill bear E. by N., or E. by N. ¼ N.; being then above the extremity of Thull Reef, long tacks to the eastward may be made with safety, towards the south end of Caranja Shoal. To work into the harbour in the night.

When the south brow of Caranja Great Hill bears East, you are on the parallel leading close to the outer edges of the Prongs; and in tacking from the north side of the channel, ought to keep the light to the westward of North. With the light bearing from N. by W. to N.W., the edge of the reef is not so dangerous and steep as farther out near the Prongs, and a ship with these bearings, if not going fast through the water, nor drawing above 18 or 19 feet, might *venture* to get a hard cast on it, when more than *half flood*. Otherwise, this is not advisable, for some ships, even in day-light, by borrowing too close, have struck on this part of the reef near low water. When the light bears from W.N.W. to W. by N., the Sunken Rock Shoal is abreast, give it a wide berth, by working well over to the eastward; and in so doing, if the depth of water decrease, or a hard cast be got on the edge of Caranja Shoal, haul directly to the westward, or tack to regain the proper channel. When the light bears W. by N., you are above the Sunken Rock Shoal, stand then well over to the western side of the harbour, and anchor with the light from W. by N. to W.S.W. at discretion, between the Sunken Rock and Middle Ground Shoals.

To steer for the anchorage at night.

When abreast of the Sunken Rock Shoal, and not too far over to the eastward, the shipping in the harbour may be discerned, if the night is *very clear*. If the ships be plainly seen, and you be anxious to reach them, observe when the light is brought to bear W.S.W., you approach the Middle Ground Shoal, and make sure of not getting too near it on one side, nor to the Dolphin Reef on the other, for the distance between them is only about half a mile: with Cross Island N. by E., you are close to the inner edge of the Middle Ground Shoal; when it bears N. by E. $\frac{3}{4}$ E., you are close to the outer edge of the Dolphin Reef, these angular bearings of Cross Island embracing the breadth of the channel, when near the shipping, and passing within the Middle Ground Shoal. If Cross Island is seen through among the ships when the light is brought nearly W.S.W., bring the former immediately to bear N. by E. $\frac{1}{4}$ E., and keep it so in running between the dangers above mentioned, till you anchor among, or close to the shipping. Cross Island may be brought to bear from N. by E. $\frac{1}{4}$ E., to N. by E. $\frac{1}{2}$ E., if the bearings can be taken exactly, which is difficult in the night; but there is not room to work in this narrow channel. The outer part of the shipping bearing N. by E. $\frac{1}{4}$ E., or on with Cross Island, is also a good mark for running up with, when all the ships are moored inside the Middle Ground Shoal; but this is not always the case, as some ships, when the harbour is crowded, moor to the northward, in the stream of that shoal. It would be imprudent for a stranger to pass within the Middle Ground Shoal to the shipping, when no marks are discerned in the night, to lead him round the outside, and north end of it; he ought therefore to anchor before the light is brought to bear W.S.W., or if needful, this may be done farther out, between the Sunken Rock Shoal and the entrance of the harbour, where the sea is broken by the reef projecting from Lighthouse Island; but farther up, above the Sunken Rock Shoal, it is more smooth.

Caution.

To steer for the anchorage in the day.

The bearings of the Light or Lighthouse, and south brow of Caranja Great Hill, which have been given as essential marks for guiding a ship into the entrance of the harbour in the night, will answer equally well in the day; and when approaching the Sunken Rock Shoal, bring Mazagon House or Hill half a point open with the outer bastion of Bombay Castle, which will lead you outside of that shoal, and directly between the Middle Ground Shoal and Dolphin Reef, to the shipping in the harbour. If Mazagon Hill is not distinctly seen, and the wind be fair, bring the flagstaff of Bombay Castle to bear N., which will carry you outside of the Sunken Rock Shoal,

and just clear of the Dolphin Reef, to the shipping in the harbour. With the flag-staff of the castle bearing North, you pass near the outer edge of the Dolphin Reef, and when it is N.N.W. ¼ W. you are near the inner part of the Middle Ground Shoal.

When the wind is northerly, ships generally work up between Caranja Shoal and the Middle Ground Shoal, then pass round the north end of the latter, in proceeding to their moorings, which is the most convenient method with a northerly wind and flood tide. The channel outside the Middle Ground Shoal, between it and the north part of Garanja Shoal, is about 1¾ miles broad.

## DIRECTIONS FOR WORKING OUT OF THE HARBOUR.

During the south-west monsoon, the spring tides are favourable for working out of Bombay Harbour; as the freshes produced by the rains then set strong out of Penn River, directly between Thull Reef and the S.W. Prong to the westward, which greatly assist a ship in working out:—whereas, the ebb tide is weak on the neaps, with baffling light winds intervening between the squalls, and a heavy sea rolling in, which frequently prevents ships from getting an offing. Some ships have worked out on the neap tides to 18 fathoms, and were driven with a heavy swell during light baffling winds, back again into the harbour. Spring tides favourable for working out of Bombay Harbour.

A large ship proceeding to sea should have her main-top-gallant mast up with the sail ready for setting, for it will be found very useful in assisting her to obtain an offing, when intervals of light breezes are frequent between the squalls; and all ships, sailing from this harbour from the middle of May to September ought to have strong sails bent. Caution.

In working out of the harbour in June and July, or in blowing, unsettled weather, be sure to keep the entrance open when the pilot leaves you; by working with the Light or Lighthouse *whilst visible*, bearing from N. ½ E. to N.N.E. ½ E., the entrance of the harbour will then be retained open, into which the flood tide and swell will drive you if there is little wind, and prevent you from being drifted to the northward of it, or from being necessitated to anchor outside. This can never be done in the S.W. monsoon without the risk of losing the anchor, and probably greater loss may be sustained. When outside of Thull Reef, the water will deepen in standing to the N. Westward near the S.W. monsoon Prong, and will shoal in standing to the southward, if you approach the flat off Kundaree Island. In June and great part of July, as the squalls come mostly from W.S. Westward, work to the southward of the entrance of the harbour with the ebb; the following flood will not be then so strongly felt as near the reef, and a considerable stretch may be made to seaward if the wind will admit, taking care not to get to the northward of S.W. Prong, by keeping the Lighthouse to the northward of N. E. by N. If bound to the southward, after getting into 20 or 22 fathoms water, you may continue to stand along the coast, if the depth does not decrease, observing to make a stretch to the N. Westward at times when the wind is favourable, until you get into 35 or 40 fathoms; you may then safely proceed to the southward, occasionally sounding, to be certain that the depth does not decrease. Directions.

In August, it is seldom difficult to get an offing, for the squalls draw to the northward of West, and the freshes usually set strong out of the rivers, enabling ships at times to stand from the harbour direct to the southward without tacking; this has

also happened in June and July, although seldom. In August, it is not so dangerous to get to the northward of the S.W. Prong, although still advisable to keep the entrance of the harbour open. In this month, when bound to the southward, you need not be particular to obtain a great offing in the parallel of Kundaree Island, but after rounding that island, you may stand along the coast, if the wind permit you to increase the depth of water; otherwise, a tack at times must be made, until it is increased to 30 or 35 fathoms.

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## COAST OF INDIA, FROM BOMBAY TO SURAT RIVER.

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From Bombay to Surat.

FROM BOMBAY to Terrapore, the coast may be approached by a large ship to 8 fathoms in fine weather, and in some parts to 6 or 7 fathoms, but not under 5 or 6 fathoms; the bottom is frequently rocky between Terrapore and Demaun: the foul ground of St. John extends a great way out, and should not be approached nearer than 12 or 13 fathoms, for within these depths there are overfalls in some places, the bottom rocky and unfit for anchorage.

When abreast of Demaun, and from thence to Surat, the coast may be approached to 5 or 6 fathoms at low water, but in standing to the westward, a ship ought not to deepen above 17 or 18 fathoms toward the banks; when within 3 leagues of Surat Road, it is proper to keep in 8, 9, and 10 fathoms, taking care not to stand off above 5 or 6 miles.

With a contrary wind, ships working between Bombay and Surat, to benefit by the tides, must not stand far from the coast, but work within 3 or 4 leagues of it: they will be obliged to anchor when the tide is against them, except on the neaps; a ship that sails well may sometimes hold her own, by stretching well out in the offing, and taking advantage of any favourable slants of wind which may happen.

A ship bound from Bombay to the northward should leave the harbour towards the latter part of the ebb, that she may get to the westward of the reef by the time the flood makes, which will then be with her, in proceeding to the northward.

Mayhim Road.

To anchor in Mayhim Road, keep the mouth of the river well open, with the church on the north side the entrance E.N.E., where a vessel may lie in 6 fathoms soft ground; but with the church bearing East, hard ground extends a great way from the land on the north side of the river; from the extremity of this hard ground, Bombay lighthouse is open with Malabar Point; the church then bearing East.

To cross the bar.

On the bar of Mayhim River there are 2 and 3 feet at low water, and about $2\frac{3}{4}$ fathoms at high water spring tides; small vessels wishing to proceed over it should keep Mayhim fort and church in one, till the ruins of a church is on with a little knob or hummock in the back land, bearing about N.E., then steer directly for it, to avoid a reef of rocks projecting from the fort to the northward, and a great way to the S. Westward; when the church is brought well open with the fort, they may haul in for the Bunder, or Custom-house, which is situated between them, and anchor in 2 or $2\frac{1}{4}$ fathoms at low water.

VERSAVAH FORT, in lat. 19° 7′ N., is about 7 miles to the northward of Mayhim Road; a vessel passing between them should not come under 6 or 7 fathoms, for under 5 fathoms the bottom is rocky; the coast generally is low, but inland the country is mountainous. Versavah river is a salt water river without any bar, having $2\frac{3}{4}$ and 3 fathoms in the entrance; the channel is close to the fort, and at this place not above 150 yards wide, being contracted by the shoal which stretches from the village along the eastern shore, and which extends nearly to the point at the west side of the entrance, on which the fort is situated. Off this place there are several rocky patches; that called Versavah Rock lies to the westward of the point, and has 5 fathoms close to it at low water, and $3\frac{1}{2}$ fathoms inside, between it and another rock, which is always above water. Inside of this rock lies Versavah Island, which is small, and joined to the point by a reef of rocks, dry at half tide. There is another shoal of rocks about a mile S.W. from the fort, having only 2 feet on it at low water, between which and the island and other rocks to the northward is the channel leading to the river. High water here at $12\frac{1}{4}$ hours, on full and change of moon, the rise of tide 16 feet. Versavah. Versavah River. Tides.

Between Versavah and Basseen lie the village and the River Murvah; the river is navigated only by boats.

BASSEEN RIVER, in lat. 19° 18′ N., and 10 or 11 miles from Versavah, has shoal water extending a great way out; the coast between these places is rocky under 5 fathoms, and should not be closely approached, as some of the rocks lie a mile from the shore. The fishing stakes are placed a great way out, and ought to be avoided in the night, by vessels working along shore.* Basseen River.

To enter Basseen River, before coming into 5 fathoms, bring the south steeple of Basseen on with the first Little Peak to the southward of the great one, or that steeple E. $\frac{1}{2}$ S., then stand in direct for Puspear Rock; when near this, edge away round the southern side of it, until it bear North or N. by W., then steer over direct for Deravee Battery on the starboard shore. If to proceed to the town of Basseen, which is several miles up the river, after passing to the southward of Puspear Rock, which lies upwards of a mile from the shore north of the entrance, keep close along the northern shore, till abreast the fort, for the centre of the river is occupied by an extensive bank, nearly dry at low water; and to the westward of Deravee Battery, a reef of rocks projects nearly to the meridian of Puspear Rock. To the southward of this rock there is a swatch of muddy ground, which divides the bar into two parts; the least depth on it at low water spring tides is 1 and $1\frac{1}{2}$ fathoms, the rise about 17 feet perpendicular, and it flows to $12\frac{1}{2}$ hours, on full and change of moon. To the N.W. of Puspear Rock there is a reef extending from it nearly two miles. Directions. Tides.

Between Basseen and Arnoll Island, the distance is about 3 leagues, the shore is rocky, and should not be approached under 8 fathoms by a large vessel. Angassee Bay, on the north side of Arnoll Island, is full of shoals, and only navigable by boats or small vessels: the channel is between the island and main, for a reef of rocks extends across Arnoll Island. Angassee Bay.

* Both to the northward and southward of Bombay, off Mayhim, Versavah, Basseen, Choul, &c., they are sometimes placed as far out as 8 or 9 fathoms: they are laid down by the fishermen at the beginning of the fair season, and taken up before the S.W. monsoon sets in. This is done by pressure, as they are forced into the ground on the falling tide, by boats affixed to them, and dragged out of it in the same manner with the flood. Each stake is valued at 50 or 60 rupees; therefore persons should be careful not to destroy the labour of these industrious fishermen.

the mouth of the bay. There is a fort on the island, which is nearly a mile distant from the main: the lat. 19° 28′ N.

Terrapore and the coast to St. John.

TERRAPORE POINT, in lat. 19° 50′ N., bears nearly N. by W. from Arnoll Island, distant 7½ leagues; between them the coast is rocky, and not to be approached nearer than 8 fathoms, for the foul ground projects from that point nearly to that depth. On the north side of it, the town and bay of Terrapore are situated; there is anchorage to the N.W. of the town, but the bottom is mostly rocky, particularly in the southern part of the bay, which is full of rocks and shoals, extending from the point to the N.W. and northward, abreast the town. The Peak of Terrapore, situated 4 leagues to the S.E. of the town and a little inland, resembles a castle when seen from the N. Westward, being composed of rugged rocks upon the summit of a hill, and there is a very sharp pyramid, called Valentine Peak, about 4 leagues farther to the northward; fronting the sea, the coast is generally low, and covered with trees. Between Bombay and Terrapore, the tides set nearly in the direction of the land, the flood a little towards it, and the ebb a little from it, about S. S.W.

High Land and Reef of St. John.

THE HIGH LAND OF ST. JOHN, about 3 leagues inland, has a regular appearance, sloping to the northward and southward from the centre, which is a round mount, and is the part always set for the body of the high land. It is in lat. 20° 2′ N., and 5 or 6 miles East of the meridian of Bombay Castle, the coast abreast being 3 or 4 miles to the westward of the same meridian. An extensive reef with rocky ground fronts this part of the coast, projecting from it 7 or 8 miles abreast the high land, and stretching from Danno River, a little northward of Terrapore, nearly to Demaun, a distance of 28 or 30 miles.

The reef and foul ground.

When the body of the high land of St. John is brought to bear E. N. E., a ship is then approaching the southern part of the foul ground, and ought not to come under 12 or 13 fathoms, for the rocky bottom reaches that depth ont in some places. With the body of the high land bearing from E. N.E. to E.S.E., a large vessel ought not to come under 13 fathoms toward the verge of the foul ground; for she might be liable to lose her anchor among the rocks, if drifted on the edge of the reef during a calm, and obliged to anchor, where the tide runs strong in eddies.

When the body of the high land of St. John is brought to bear E.S.E., a ship is to the northward of the extremity of the reef, and may stand in to 10 or 11 fathoms, at tacking from the shore; but not closer than 10 fathoms till nearly abreast of Demaun, for the coast continues rocky as far out as 8 or 9 fathoms, until that place is approached.

To proced to Surat Road.

When round the foul ground of St. John, a ship should steer to the north-eastward to get near the coast; in working she may stand in to 10 or 11 fathoms, and off to 18 or 20 fathoms, but in standing far over to the N.W., if she begin to shoal on the southern part of Malacca Banks, it will be prudent to tack, and stretch over towards the coast, and then keep within a moderate distance of it, in proceeding toward Surat Road.

Demaun.

DEMAUN, in lat. 20° 22′ N., belonging to the Portuguese, is known by two square steeples, and the white appearance of the buildings; also by a hill to the northward, composed of four hummocks, called Demaun Hills; and farther northward, a round fortified mount, called Poneira, or Panella Hill, standing very conspicuously by itself

on the level plain. On the south side of the river, about $2\frac{1}{2}$ miles distant, on a hill, is Enderghur Fort, which is another mark to know this place. Ships may anchor in Demaun Road in 8 fathoms, with the river open, bearing East, and Panella Hill N.E. $\frac{1}{2}$ N., off the town about 4 miles. To stand over the bar into the river, keep the flagstaff of the northern fort E. $\frac{1}{2}$ N., or the entrance of the river bearing East, and steer direct for it; the depth at low water spring tides is 2 feet on the bar, and 18 or 20 feet inside between the forts at the town, where the bottom is soft mud. The bar is very flat, mostly hard sand, except from the north point of the river, rocky ground projects a great way out. There is never less in common springs than 3 fathoms, at high water, on the bar, the rise of tide being 17 or 18 feet, and flows to about $1\frac{1}{2}$ hours, on full and change of moon; but in the offing, the flood continues till $2\frac{3}{4}$ hours. The road. To cross the bar. Tides.

Provisions and vegetables are cheap and plentiful: it is an excellent place for small vessels to remain during the S.W. monsoon, or to receive repairs if needful, the country being well stocked with ship timber. Many ships, from 500 to 900 tons burden, have been built in this river. Refreshments.

OMERSARY RIVER is distant 6 or 7 leagues from the former, having a dry bar at three quarters ebb; a small vessel bound into this river should bring a high white building inland at Pardee, to bear E.S.E., then steer in with the entrance of the river open; when Panella Hill bears E. by N., she will be inside the bar, and in the entrance of the river she may anchor, when the land to the northward is shut in with the point on the same side. Omersary River.

BULSAUR RIVER is distant about 2 leagues farther northward, in lat. 20° $34\frac{1}{2}'$ N., having 2 or 3 feet on the bar at low water spring tides, the rise about 18 feet perpendicular, and flows to $1\frac{3}{4}$ hours, on full and change of moon. A vessel proceeding into this river ought to bring the northernmost tree, or Grove of Cossumba, to bear E. by S. in one with the south point of the entrance, and may then steer directly for it with safety. Outside the bar, about half a mile from it, there is a rocky bank with 6 feet on it at low water; and inside between them, 12 and 13 feet, soft ground. In the river there are 7, 8, and 9 feet at low water. Bulsaur River.

GUNDAVEE RIVER is distant 8 miles N. by W. from Bulsaur River, having a bar above a mile from the entrance, with 3 and 4 feet on it at low water. To get into it, bring two palm trees, called Mender Tree, to bear E.N.E., then steer over the bar with this bearing, for the shore to the northward of the entrance, taking care to avoid the north end of the south sand, on which fishing stakes are sometimes placed. When a flat bush, resembling the top of a barn, is brought to bear S. by E., steer for it, and anchor close within the south point of the river, or outside of the entrance close to the northern shore. High water at 2 hours on full and change of moon; the rise of tide 19 feet. Gundavee River. Tides.

NUNSAREE RIVER bears from Gundavee River about N.N.W., distant 5 leagues; it is wide at the entrance, but difficult of access, on account of the winding channel among the banks, which has generally 3 or 4 feet in it at low water spring tides. A small vessel bound into it should bring a round bushy tree on the south side the entrance to bear E.N.E., and steer for it until the southernmost trees on Nunsaree River.

Bansee point, the western entrance point, bear N.N.W.; she will then be close to the south point of a sandy island, and must steer along the east side of it, keeping Bansee point N.N.W. until it is closely approached, where she may anchor; or steer along the point till the bushy tree bears S.E. by E. $\frac{1}{2}$ E., then stand across the river towards it, and anchor very close to Nunsaree Point.*

Character of the shore.

Between Demaun and Surat River the land near the sea is low, covered with trees, and in some places, particularly contiguous to the rivers, it is inundated during high tides in the stormy season.

Directions from Demaun to Surat Road.

When round the foul ground of St. John, and abreast of Demaun, steer along the shore for Surat Road, and do not stand farther off than $2\frac{1}{2}$ or at most 3 leagues from it, nor deepen above 14 or 16 fathoms: in working, stand to 5 or 6 fathoms on the soft bank lining the shore, but if anchoring at *high water* on the edge of this bank, to benefit by the first of the following flood, do not anchor under $7\frac{1}{2}$ or 8 fathoms in spring tides, because the water sometimes falls 19 or 20 feet perpendicularly. In 1788, bound from China to Surat in the Gunjavar, a large ship drawing 21 feet, belonging to Chillaby, a respectable Mahomedan merchant of the latter place, we anchored in $6\frac{1}{2}$ fathoms, and grounded in the soft mud at low water.

Caution in anchoring.

With Poneira Hill bearing about E. $\frac{1}{2}$ N., Poneira narrow spit of sand extends a great way out, with different depths on it from 8 to 13 fathoms; this may sometimes be a guide in the night when passing at 5 or 6 miles' distance from the shore, if the lead is kept going, as the water will shoal suddenly in crossing it, and soon return to the former depth when over the spit. Having passed 3 or 4 leagues to the northward of Poneira Hill, a ship should steer along shore, in soundings from 7 to 9 or 10 fathoms; but in working, if she stand far out, and get a cast of hard ground, or shoal on the edge of the Malacca Banks, she should tack instantly toward the land. When within 4 or 5 leagues of Surat Road, she ought to work from $6\frac{1}{2}$ or 7 fathoms towards the shore, to 9 or 10 fathoms in the offing, as the channel then becomes more contracted; 9 or 10 fathoms is a good track with a fair wind.

Vaux's Tomb.

Anchorage in Surat Road.

SURAT ROAD and RIVER are situated at the entrance of the Gulf of Cambay, Vaux's Tomb, on Swallow Point, the north entrance point of the river, being in lat. 21° $4\frac{1}{2}'$ N., lon. 0° 6′ W. of Bombay. The anchorage ground for large ships in Surat Road is in 7 or 8 fathoms at low water, with Vaux's Tomb bearing N. $\frac{1}{4}$ E. to N. $\frac{1}{2}$ E., and False River entrance E. by S. to E.S.E., very soft ground. Here, on the springs, the tides run very rapidly, particularly the ebb, about 5 knots per hour; but farther in, where small vessels lie near the bar, in 4 or 5 fathoms at low water, with the tomb N. $\frac{1}{4}$ W., they do not run with equal velocity.

Description of the bar and river.

Proper directions cannot be given for a stranger to proceed over the bar into Surat River, because the sands are continually changing, by which new channels open, and the old ones are shut up. Formerly, that called Domus Channel was the deepest, and

* Between Nunsaree and Surat Rivers there is another called False River. These rivers, which have been described, are only frequented by boats and small vessels, and their channels, by the shifting of the sands, are liable to alter; it may therefore seem of little utility to have noticed them so particularly: but it may probably sometimes happen that a storm will overtake a ship on this part of the coast, and force her to run for the nearest river, to prevent being driven on shore. If this is attempted, it ought to be near high water, to afford a chance of succeeding. Demaun River is the safest and most favourable for such purpose. The Hornby, of 700 tons burthen, and other smaller ships, were saved by running at the last extremity into this river when encountered by sudden storms, on departing from Surat Road in the month of May.

generally used by ships; it took a direction on the east side of the banks, toward the village Domus, on the eastern shore, but it is now filled up, being only navigable by boats at half tide. The proper channel over the bar at present is between the sand that projects above a mile from Swallow Point, forming the north side of the bar, and other extensive sands, which fill the middle of the river, and the eastern shore. After turning round the extremity of Swallow Sand, the channel takes a direction to the northward, close along the western shore of the river, where it becomes much deeper, and more safe than between the sands outside. Although this is the proper channel to enter the river, it is narrow, and at low water spring tides there is not depth sufficient for a small boat between the dry sands near the bar, which, to those passing outward, have a dreary aspect, being elevated 12 or 14 feet on each side of this contracted channel; boats passing down with the latter part of the ebb in this narrow gut are carried along very speedily, by the water rushing through it with great violence, and being very shallow, are liable frequently to touch the bottom, when the Lascars, or sailors, acquainted with the river, always leap out to support the boats, and prevent them from upsetting. The distance from the bar to the city of Surat is about 6 leagues; nearly two-thirds of the distance there is a continued chain of banks, many of them dry at half tide, with very small depths at low water, in the channels between them. Above Omrah, and near the city, the river is more contracted, with deeper water. Surat Castle is in lat. 21° 11′ N., and 8 miles East of Bombay Castle by chronometers. In the road, it is high water on full and change of the moon, about 4 o'clock. Variation 0° 30′ W. in 1791. Surat.

In Surat Road, and in the entrance of the Gulf of Cambay, southerly winds and blowing weather set in sooner than at Bombay. It is considered dangerous for ships drawing much water, to remain in the road after the middle of April, for in this month, and early in May, smart southerly winds frequently blow during the springs, particularly in the night, with the flood tide. These winds produce a considerable sea, which, by the strength of the tide, strikes forcibly against a ship, causing her to drive and bring both anchors a-head: this is also sometimes occasioned by the strong tide lifting up the stern cable against a ship's heel, causing her to sheer obliquely to the stream, until she bring both anchors a-head. It is therefore advisable, when a ship is detained in Surat Road late in the season, to keep at single anchor with a good cable down, sighting it at every convenient opportunity; by so doing, she will ride better in blowing weather than if two anchors were down, and should circumstances make it necessary to cut or slip, only one anchor will be left on the ground. Storms.

At such times, it is prudent to keep a pilot on board, that he may carry the vessel, if small, into the river, should a storm be apprehended: or to Gogo, if it seem more eligible, where she will be sheltered by the reef and Island of Peram. In some storms that happened late in April and early in May, several ships have been lost by remaining too long at their anchors, when the wind had veered round to the westward, and prevented them from weathering Swallow Point.*

* In the heavy storm that happened on the 20th of April, 1782, several large and small ships were moored in Surat Road; some parted their cables, were driven on shore, and went to pieces; others held fast, but rolled away all their masts by the heavy sea; three of those lost, belonged to Chillaby, one of them completely laden for Basra, called Fatty Bumbarack, rolled away her masts, and foundered when the wind had veered and was blowing hard from the land, occasioned by her labouring between the wind, tide, and high cross sea, from southward and westward: excepting one Lascar (whom I have sailed with), all the crew of this ship perished. She was a strong vessel, with a valuable cargo on board. Since 1782, no such heavy storm has happened in April at Surat, nor even in May, although some gales have been experienced in the latter month.

Indications of the approach of storms.

The approach of a gale in these months is sometimes indicated by dark cloudy weather, gloomy and black to the S. Eastward, with lightning and faint variable breezes, mostly from southward; with these indications, a ship should ride at single anchor, in a state of preparation for severe weather, with a good fore-sail, and storm stay-sails bent. Some ships lie with topmasts struck, the fore-sail and storm stay-sails being sufficient to run with, over the bar, or to Gogo.

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# GULF OF CAMBAY, AND BANKS NEAR THE ENTRANCE.

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## COAST AND DANGERS.

Malacca Banks.

The head or northern limit of MALACCA BANKS should never be approached with an ebbing tide; being steep to, the soundings give no warning, and were a vessel to take the ground, she would be overset in an instant by the rapidity of the tides. The easternmost danger of these banks is in lat. 20° 56′ to 21° 1′ N. about 5 or 6 miles from Surat Bar, having 1 and 2 fathoms on it at low water. Vaux's Tomb bears from it N. 50° E. The south-easternmost danger, dry at low water, is in lat. 20° 50′ N.: the ships in Surat Road bearing from it N. 47° E., just discernible from the deck of a small vessel when close to it. About 3 or 4 miles directly West from this, there is another dry bank; and from the latter, shoal water extends about 3 leagues to the southward, usually from 3 to 5 or 6 fathoms. To the southward of lat. 20° 30′ or even 20° 33′ N., there appears to be no danger on the southern extremities of these banks.

The north-easternmost danger or head of the banks is in lat. 21° 10′ N., distant about 5½ miles from the shore of Swallow, and the channel between it and Swallow Bank is about 3 miles broad, this shore bank projecting out 1½ miles. These are sometimes called the *inner* and *outer* sands of Swallow, and are both dry at low water.

From the north-easternmost danger, or outer sand of Swallow, the distance is 10 or 11 miles due West to the *dry* bank called Goapnaut; the northern limit of shoal water extending nearly in a direct line between them, having 17 or 18 fathoms close to it.

Goapnaut Bank.

Goapnaut Bank has 10 fathoms within 200 yards of the dry sand at half tide, and joins to the north-western extremity of the Malacca Banks, which are distant about 8 miles farther to the westward; from hence, these banks extend southward to lat. 20° 40′ N., where are 1 and 2 fathoms about 5 miles West from the meridian of Goapnaut Point, thought to be the S. Westernmost danger. The whole of the Malacca Banks, whose exterior boundary has been described, are joined together by shoal water, without any safe channel between them.

Passage from Surat Road to Broach.

From Surat Road, when bound to the northward with the flood, a course about N.W. will be necessary, to lead between Swallow Bank and the Head of the Malacca Banks, in 13 or 14 fathoms, or a vessel may keep about 3 or 4 miles from the shore in soundings from 10 to 13 fathoms, which will lead through the fair channel, in passing between them. When Cutcheree Tree (a large single brab tree on a low point) bears E. by N., haul out W. by N. until Bogway Point bear N.E. ½ E., Donda

E. by N. $\frac{1}{2}$ N., and Cutcheree Tree E. by S. $\frac{1}{4}$ S., you will then be clear to the westward of Goolwaller Sand, in soundings from 10 to 14 fathoms, and ought to steer N. by W. for Broach Road.

The sands off Bogway extend about 5 miles from the shore, and are called Goolwaller and Bogway Sands; between them and the main there is a channel, through which the small coasting vessels pass in 3 and 4 fathoms water; but in the night, or in a large vessel, it is advisable to keep well out to the westward of these sands. From the land of Swallow to Broach Bar, a continued bank extends along the shore, which at Broach River entrance projects out about 5 miles. Bogway Sands.

The bar of the river is in lat. 21° 35′ N., and Broach Point, about 4 miles farther to the northward, is 5 miles West from the meridian of Vaux's Tomb. A vessel may anchor off the bar, with Broach Point N. by E. $\frac{1}{4}$ E., distant 4 or 5 miles, and Peram Island W. $\frac{1}{4}$ N. in 6 fathoms at low water. Broach Bar, River, and anchorage.

The tide flows here, till about $4\frac{1}{4}$ hours on full and change of moon, velocity 6 knots per hour, rising nearly 30 feet perpendicular. On the north side of the river, a great way up, the town of Broach is situated; vessels of considerable burden may proceed to this place, as the channels are deep in many places, but too intricate to be navigated without a pilot. On the east side of the gulf, the flood sets about N. by E. and the ebb S. by W., except where their direction is altered by the form of the sands. Tides.

From Broach Bar to Jumbasseer Road, in lat. 21′ 49° N., a flat, dry at low water, projects $1\frac{1}{2}$ and 2 miles from the shore, with soundings close to it, from 4 to 7 fathoms. In passing along here, a vessel should keep within 3 miles of the shore, in 7 or 8 fathoms at low water; and in working, she ought not to stand off above 5 or 6 miles, in 8 to 10 fathoms; for the tide is so rapid, that great difficulty would be found in regaining the shore, were the wind to fail whilst she is in the offing. Passage from Broach Bar to Jumbasseer Road.

Jumbasseer Road may be known by the entrance of the river being open, and a pagoda on the north side of it, where vessels may anchor in 7 fathoms at low water, with the pagoda bearing E.N.E. $\frac{1}{2}$ N. 4 or 5 miles, and Jumbasseer Point E. by N., the dry part of the flat distant $1\frac{1}{2}$ miles. Here they will ride in safety, the north part of the flat breaking the strength of the tide, which flows until about $4\frac{3}{4}$ hours on full and change of moon, and rises from 33 to 36 feet perpendicular. From this river, cotton, grain, and oil, are exported in considerable quantities to Bombay and other places. Jumbasseer anchorage. Tides.

From Jumbasseer to Gongway, the distance is about 6 leagues, in a channel from 1 to 2 miles wide, but very dangerous by the rapidity of the tides: the soundings in it are from 2 to 7 fathoms, at first quarter flood. The flat to the northward of Jumbasseer stretches 4 miles from the shore in some places, and a vessel should keep within a quarter of a mile of it in passing along, in 2, 3, and 4 fathoms, until a small clump of trees is bearing East, then haul in for the shore, keeping within 200 yards of it, till abreast the town of Gongway; the anchorage is about 80 yards from high water mark, where vessels ground in the mud at first quarter ebb. No vessel must go farther than Gongway in one tide from Jumbasseer, for if she cannot reach Cambay Creek it is dangerous, as she must return to Gongway. It is high water here about $5\frac{1}{4}$ hours on full and change of moon. It must be observed, that the sands and channels in the northern part of the gulf are liable to shift annually, by the violence of the freshes. From Jumbasseer to Gongway.

To the northward of lat. 22° 3′ N., the gulf is dry at low water spring tides, from side to side, up to Cambay.

Gulf from Gongway to Cambay.

From Gongway to Cambay, in lat. 22° 24′ N., the distance is about 5 leagues; the small vessels that navigate here always weigh at first quarter flood, and stand over, keeping the pagoda at Cambay bearing about N. by E. $\frac{3}{4}$ E., and from N. by W. to N.E. by N. in working, when to the northward of Dagom; for the shore must be kept close a-board until they pass that place. The soundings are from 2 to 4 fathoms with overfalls, and the tide so rapid, that a vessel taking the ground would immediately overset, and probably every person on board perish, which has frequently happened through the neglect or obstinacy of the pilots. In this part of the gulf, the flood sets N.E. and the ebb S.W.

DIRECTIONS.

To sail from Surat Road in the S. W. monsoon.

If a vessel be detained in Surat Road until the S. W. monsoon sets in, it will be found very difficult, if not impossible, for her to get to the southward round the foul ground of St. John, as a heavy swell tumbles in upon the shore, rendering it very troublesome to get an offing. She must, therefore, if bound to Bombay, or any other port in the southern or eastern parts of India, proceed to the northward for Gogo, where she may obtain supplies; and from thence, work along the west side of the gulf to Goapnaut Point, and afterwards to Diu; from the latter place, she may stretch off from the land, and will probably reach Bombay without tacking.

To sail from Surat to Gogo.

A ship departing from Surat Road, or when driven from it by the S.W. winds setting in strong, ought, with the flood tide, to steer about N.W., keeping in 13 or 14 fathoms until through the channel between Swallow Bank and the head of Malacca Banks. The same course continued, unless the tide is very strong, will lead her upon the hard ground off Peram Island, which is an excellent guide in the night, or in hazy weather; she ought to keep along the edge of it in 12 to 14 fathoms, about 2 or 3 miles' distance from the island, taking care to edge away to the northward, if the depths decrease considerably. When to the northward of the hard ground off Peram, or with Gogo Town bearing W.N.W., she ought to haul in directly for it, and anchor in 3 or $3\frac{1}{2}$ fathoms at low water, with the house on Peram S.S.E. $\frac{1}{2}$ E., directly abreast of Gogo Town. In running for the anchorage, care is requisite not to get to the northward, for, E.N.E. of Gogo Creek, there is a bank dry at low water. And it must be observed, that the perpendicular rise and fall of tide is from 30 to 33 feet on the springs, and that it flows to about 4 hours on full and change of moon, except when affected by northerly or southerly winds.

Anchorage off Gogo.

The town.

The town of Gogo, about 7 miles N.W. from Peram Island, is in lat. 21° 41′ N. and 28 miles West of Vaux's Tomb by chronometer; the best Lascars in India are natives of this place, and ships touching here may procure water and some refreshments, or repair any damages sustained. It is a safe place for vessels to remain during the S.W. monsoon, or to run for, if they part from their anchors in Surat Road, being an entire bed of mud three quarters of a mile from the shore, and the water always smooth. The land about Gogo being generally low, is inundated at high spring tides, which obliges the fresh water to be brought 4 or 5 miles' distance. Fire-wood is scarce.

Caution.

A ship leaving Gogo Road with the ebb must take care that the tide does not set her down on the reef off Peram, or between that island and the main, where the tide runs 10 knots per hour through a narrow gut among the rocks, but there is no safe passage for a vessel, although the island is 2 miles distant from the main land.

Excepting the bank to the N.E. of Gogo, dry at low water, the gulf is clear of danger across to Broach Point.

To sail from Surat Road.

If necessitated to leave Surat Road by strong southerly winds, and not intending to

run for Gogo, you may, if the weather become favourable, stretch across the gulf to the northward of the Head of the Malacca Banks, for the coast about Sultanpore, where you may anchor in smooth water to the northward of the bank abreast the river, or work to the southward round Goapnaut Reef and Point, if circumstances admit, and afterwards to the westward, along the coast to Diu.

To beat from Goapnaut Point, or from Gogo to Diu Head, after the S.W. monsoon is commenced, may not be always practicable, but a handy ship that sails well, having very good canvas, and proper ground tackling for working tide work, may probably find little difficulty in doing it; for this the moon-light nights may be considered most favourable, the winds being then not so violent in general as during the spring tides at the change of the moon.

From Gogo towards Goapnaut.

A ship being well prepared to encounter strong winds, and if bound to Bombay or other parts of India, should sail from Gogo Road at high water, and steer round the N.E. part of the hard ground off Peram; when round it, she ought to work to the southward with the ebb, and may stand to 7 or 8 fathoms in tacking from the shore, or nearer if requisite.

Coast from Peram Island to Sultanpore.

From Peram Island to Sultanpore River the coast has a barren aspect, fenced by rocks, and difficult of access, but may be approached to 5 or 6 fathoms.

Sultanpore River is in lat. 21° 20′ N., having a conical hill inland, about 5 miles to the W. N.W., called Tullijah Hill; when this hill is brought to bear West, a ship must keep farther from the shore, for abreast the entrance of the river, at 4 miles' distance, there is a dangerous bank, nearly even with the surface of the sea at low water. It is about 1 mile long and half a mile broad, having 5 or 6 fathoms within it, and is steep to, on the outside, 17 fathoms about 1 mile off, and 12 fathoms close to. Between this bank and the shoal off Goapnaut Point, there is a channel leading to Sultanpore River, by keeping Tullijah Hill and Settrujah Hill in one bearing N. 60° W., which leads a vessel through in the deepest water, 2 and 3 fathoms soft ground.

From Sultanpore to Goapnaut Point.

To work round Goapnaut Shoal.

Having reached the shoal off Goapnaut Point, it will be prudent to choose day-light to work through the channel between the south end of it and the N.W. extremity of the Malacca Banks, as the soundings are no guide, the depths being 15 to 18 fathoms from side to side, and the channel scarcely 4 miles broad. When round the shoal off Goapnaut Point, every advantage of the tides should be taken, by anchoring when they are unfavourable, and keeping near the coast in working along, observing, as formerly noticed in the description of this coast, that the soundings give little warning of the approach toward the shore, there being 8 and 9 fathoms close to it in some places, and the same depths 3 or 4 leagues off. When near Searbett Island, or Jaffrabad, longer tacks off shore may be made occasionally, being then to the westward of the S.W. extremity of the Malacca Banks; but it will be proper to continue to work within a reasonable distance of the coast, keeping near it till she reach Diu Head.

From Goapnaut to Diu Head, and to the southward

Having worked this far to the westward, stretch out from the land with the ebb tide, and if the wind incline from the westward, a ship will probably get into the latitude of the entrance of Bombay Harbour at a considerable distance from it, without tacking; but if the wind incline to the S. S. W., or S. W., it will be proper to tack occasionally to preserve the westing: for she must by no means approach near the coast to the northward of the entrance of Bombay Harbour, whether bound into it, or to the southward along the Coast of Malabar to Cape Comorin. Were she to get near the land to the northward of Bombay Harbour, it would be found very difficult, if not impossible in bad weather, to work to the southward round the reef, against the heavy sea, and

northerly drain of current setting along shore at the beginning of the monsoon; but well out from the land, the sea runs more regularly, and advantage can be taken to tack with favourable squalls or shifts of wind, whereby a ship will generally gain ground in working against the monsoon to the southward.

If a ship intend to work along the Guzarat Coast to Diu Head, a pilot for the Gulf of Cambay should be on board, who may be procured at Surat or Gogo; and he may probably be conveniently landed at Diu in passing, or carried to Bombay, as circumstances require.

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# GUZARAT, OR KATTIWAR COAST, AND THE GULF OF CUTCH.

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## GOAPNAUT POINT TO DWARKA.

Coast from Goapnaut westward.

GOAPNAUT POINT,* in lat. 21° 12′ N., is on the west side of the entrance to the Gulf of Cambay, opposite the coast near Surat, from which it is distant about 11 leagues. A dangerous shoal projects nearly 4 miles from the point to the eastward, and stretches about 3 leagues along the coast to the northward, having 16 fathoms water, within half a mile of its southern extreme; but on the north and east sides, it is not so steep, the depths there decreasing more regularly on a sand-bank. Goapnaut Point may be seen at 5 or 6 leagues' distance in clear weather; and a little to the westward of it there is a Hill Fort, called Jaunmair. At the distance of between 18 and 20 miles S.W. by W. of Goapnaut Point are the bays of Cutpore and Mowah; the coast in the interval is clear to 10 fathoms, within a mile of the shore, but the soundings are no guide, as the depths differ very little from 1 mile to 3 leagues off. There is little shelter on this part of the coast against westerly winds: in Mowah Bay, the anchorage is bad, the bottom being sand from 7 to 10 fathoms, and with the flood tide, a vessel must lie with a reef of rocks right astern.

Searbett Island.

SEARBETT ISLAND, in lat. 20° 55′ N., is 16 miles from Mowah Point, the coast between them forming a straight line, with detached rocks in some places, from half to three-quarters of a mile off shore. There is a channel round the S.W. end of this island, through which vessels may pass, and be sheltered under the north part of it from the S.W. monsoon, by nearly shutting in the opening of the west channel. From the east end of it to the main, the water is shoal, but there is anchorage in 4 to 6 fathoms, soft ground, under the east end of the island, or on the north side of the rock that lies from it a small distance. This island was formerly the resort for pirates, and afforded them good water, and some grain. High water at 1 hour 30 minutes, on full and change of moon; the rise of tide 10 feet.

Tides.

Jaffrabad.

JAFFRABAD, in lat. 20° 53′ N., about 6 or 7 miles to the W.S.W. of Searbett Island, has the best river on the coast, there being no bar, and the entrance easy;

* Named from a place of worship built there, dedicated to the Hindoo Deity Goapnaut; around it there is a copse of bushy trees.

although shoal, vessels will receive no damage by lying in the soft mud at low water, as they are well sheltered. The town is about a mile up the river, surrounded by a wall; next to Diu, it is the most considerable place for trade on the coast of Guzarat.

RAJAPOUR, distant from Jaffrabad about 13 miles to the westward, has a fort on the point, and the coast between them is safe to approach within half a mile. Rajapour.

NOWA-BUNDER, formerly a nest of pirates, lies about 3 leagues farther to the westward, and is in one with a high hill inland, called Janaghur Hill, bearing N. by E. There is a creek at this place where they haul up their boats, and small vessels may moor in 3 fathoms, under the point, and be sheltered from the S.W. monsoon. Nowa-bunder.

DIU, or DIO ISLAND, which belongs to the Portuguese, lies off the south extreme of the coast of Guzarat, from which it is separated by a very narrow channel, and being upwards of 7 miles in length East and West, which is the direction of the coast, it appears to form a part of it. Diu Castle, Island, and Road.

Diu Town stands on the east end of the island, the castle being in lat. 20° 43′ N., lon. 71° 6′ E., by Lieutenant Whitelock's survey, and is 4 or 5 miles from Nowa-bunder. Off the point on which the town stands, and which projects to the eastward, there is a rocky ledge extending upwards of a quarter of a mile farther in the same direction, and protecting to the southward the bay formed by the main coast opposite. The bay or harbour is further protected by two small banks, one a quarter and the other three quarters of a mile to the eastward of the rocky ledge which is before described to extend from the town point. These patches have 1 and 2 fathoms on them, with from 3½ to 6 fathoms in the channel between, and 3 and 4 fathoms in the channel between the western one and the town point ledge. The general depth of the anchorage is 3 and 4 fathoms, with muddy and sandy bottom. Position of the castle.

The channel between Diu Island and the main is only navigable by fishing boats at half tide, the western entrance having 4 or 5 feet on the bar at low water, and is protected by a fort. High water at 2 hours on full and change of moon; rise and fall 6 feet. Variation 0° 40′ West in 1833. Tides.

The water is brackish, excepting that procured during the rainy season, which is kept in tanks or reservoirs, for general use; provisions are plentiful, and although the island appears unfit for cultivation, the market is well supplied with vegetables from the main. The town is well fortified, surrounded by a wall, with towers at regular distances. On the east side, off the castle, there was formerly depth for a 74-gun ship, within 500 or 600 yards of the wall, by taking care to avoid a rock above water, which joins a line of rocks stretching from the castle; but the depth seems now to have decreased.

DIU HEAD, the southernmost point on the coast of Guzarat, or Kattiwar, is in lat. 20° 42′ N., lon. 70° 56′ E. of Greenwich, and distant about 2 miles from the west end of Diu Island. On the east side of the Head there is a small bay or harbour, where vessels might lie sheltered from westerly winds, in from 2 to 3½ fathoms. Diu Head

About 4 miles West from Diu Head, and 2 miles off shore, lies the east end of a rocky bank, which extends about 4 miles in a W.N.W. direction, parallel to the coast, having 3½ fathoms water on it, and 8 or 9 fathoms between it and the opposite shore, on which stands the village of Sirkaree.

General character of the coast, between Goapnaut Point and Diu Head, and thence to Gulf of Cutch.

The coast of Kattiwar from Goapnaut Point to Diu Head, is generally bold, safe to approach, of moderate height, but rather low in some places; trees, or the appearance of cultivation, are very seldom perceived, and it is destitute of a good harbour, where a ship could ride with safety during a gale of wind. The depths along it are nearly equal at different distances from the shore, the soundings, therefore, do not give sufficient warning, nor always denote the distance off.

From Diu Head, the coast takes a direction about W.N.W., 8 or 9 leagues, then N.W. by W. and N.W. to Jigat Point, the S.W. extremity of the Gulf of Cutch, the distance between them being about 46 leagues. The land contiguous to the sea in this space is generally of moderate height, but high in the country. Along the coast the soundings are regular, from 34 or 36 fathoms 7 or 8 leagues off, to 10 or 12 fathoms near the shore, which, excepting the bank near Diu Head, already mentioned, is mostly bold and safe to approach, but it contains no safe harbours, unless for boats or small vessels. There are many towns on this part of the coast, from some of which they export cotton wool, and other articles, to Bombay; but several of them were inhabited by a predatory race, who lived on the plunder obtained by assaulting small trading vessels and boats.*

Jigat Point.

JIGAT POINT, called also Dwarka, from the large Temple of Dwarka standing near the coast, is in lat. 22° 13′ N., lon. 68° 52′ E. The land here is moderately elevated, and stretches to the North and N.N.E. about 16 miles to the north extreme of the Oka coast. On the east side of Oka Point is the Island of Bate, between which and Oka is the harbour of Bate, hereafter described.

## GULF OF CUTCH.

THE GULF OF CUTCH has been partly explored by Lieutenant J. Middleton, of the Bombay Marine, in 1821, who had the command of the Sylph cruizer, and two smaller vessels, for protection of the trade, against the pirates, whereby he was enabled, from observations and experience, to construct a chart of that gulf, accompanied by the following remarks and sailing directions, which will prove valuable to those who may have occasion to visit that branch of the Indian Seas.

In working round the Coast of Oka, after passing the Pagoda or Temple of Dwarka, which is very conspicuous, do not approach the Oka shore under 16 fathoms, till clear of Kulchee-gud shoal, which is 7 or 8 miles from Jigat, nor until Kulchee-gud Fort bear S. by E. ½ E., then you may borrow to 10 fathoms rocky bottom; but not under 16 fathoms in the night.

Oka Coast.

About a mile north of Oka, or Arambra Point, lies the bar, having on it, near high water, 3¼ and 3½ fathoms rocky bottom; and outside of it, half a mile distance, 14 and 15 fathoms. A reef projects from the N.E. extreme of Oka, and a little farther in the same direction lies the high rocky Island Soomia, or Sonia; betwixt which and the reef just mentioned is the passage into the harbour, being about a quarter of a mile wide.

Directions for Bate Harbour.

A vessel bound into Bate Harbour should round the north extreme of the Oka Coast, about a mile distant, keeping Bate Flagstaff a little shut in, or on with the N.E. sandy point, in crossing over the bar; the water will deepen afterward to 5 and

* The Guzarat Pirates have now generally relinquished their predatory habits, since that coast became subject to British authority.

6 fathoms, in standing toward the south point of Sonia; she must borrow on this island, to avoid the reef projecting from the Oka shore, in passing between them, where the depths are from 4 to 7 fathoms, rocky bottom. When through this passage, a direct course to the E.N. Eastward should be steered towards Bate Castle, borrowing a little on the starboard side; the depths will be found irregular from 7 to 4 or 3¼ fathoms. Abreast the castle, about mid-channel between the islands, there are 6 and 7 fathoms in one place, and 3, 4, and 5 fathoms around; the bottom mostly rocky and uneven throughout the harbour.

The mark for crossing Bate Bar is the Fort a little shut in with the point on the S.W. side of the entrance: at low water spring tides, there is only 1½ fathoms on the Bar. In working out, stand towards Oka to 7 fathoms, and towards the Reef to the northward of the Island Sonia into any depth at discretion, as the water shoals regularly towards it. The mark for crossing the bar will carry a vessel clear to the westward of that reef. Bate.

Bate* Castle is in lat. 22° 28½′ N., lon. 69° 20′ E., by lunar observation. Variation 1° 23′ W. in 1803. The rise of tide is 14 feet, high water at 12 hours on full and change of moon.

Chineeree Reef, to the northward of Bate Island, is very extensive, and is the first or outermost danger on the south side of the entrance of the gulf. In sailing for Battypore Bay, on the east side of Bate Island, a vessel should not come under 14 fathoms on the north side of Chineeree Reef until Sonia Pagoda bears S.W.; then, Chineeree Reef, or sand, may be approached to 9 fathoms, taking care in rounding it, not to go under 7 fathoms, nor approach Pugger Reef (which lies to the East of Bate Island) above 10 fathoms. The best anchorage is off Konee-manus Point, the eastern extreme of Bate Island, taking care not to open Battypore Bay, because in this case the depth decreases very quickly in standing to the southward; there is 5 fathoms mud about half or three-quarters of a mile from the shore, with the point bearing about S.W. by W. Chineeree Reef.

Pugger Reef, about 3 miles to the eastward of Konee-manus Point, is overflowed at high water: a vessel should not attempt to pass to the southward of this shoal, except at low water, when it, the Reef off Poseetra S. Eastward of Bate, the southern extreme of Charanka, and the small reef off it, can be seen. The best depth to keep in is from 12 to 15 fathoms, but in working to the westward of Poseetra Reef, the point may be approached to 7 fathoms. The best track is between Chewsrah and the small reef off it, where the soundings are from 13 to 15 fathoms rock: Adgar Reef must not be approached on the north side under 10 fathoms. Any vessel may go to the southward of Chewsrah from Battypore Bay as far as Adgar Island, which is nearly 3 leagues eastward from Poseetra Reef, but ought not to attempt to go farther up the gulf to the southward of Charanka, Great Shoal, as there is at one part only 1½ fathoms at half tide. Good water may be procured on the Island of Adgar. Pugger Reef, &c. Adgar.

In passing to the northward of Pugger Reef, do not come under 18 fathoms.

Charanka, or Chunka, is a reef extending E.N.E. and W.S.W., about 8 or 9 miles, and its N.E. end is in lat. 22° 33′ N., about 18 miles to E.N.E. of Konee-manus Point. The soundings on the north side of this reef are no guide until the centre of Charanka Reef.

* This place is of considerable strength, and was a rendezvous for the pirates. His Majesty's frigate, Fox, the Teignmouth, and Ternate, Bombay cruizers, were sent on an expedition here, in April, 1803; they burnt about 30 of the pirate boats and vessels, made an attack on the castle by landing a party of men with some guns, and by firing on it from the ships, but were repulsed with some loss. According to the survey of Mr. J. H. Jones, of the Indian Navy, the castle is in lat. 22° 27′ N., lon. 69° 10′ E.

the north end of the trees on Charanka bear S.W. by S., when the water shoals regularly to 8 fathoms towards the reef, which is a good depth to keep in, running along it to the N.E. end, until the north end of the trees on Charanka bear West, where you may anchor within half a mile of the reef in the same depth. The whole of this reef is covered at high water, excepting four patches on it, which have trees on them, and are called by the natives, Charanka, near the N.E. end, Norah the next, then Bidah, and Chewarah at the S.W. point of the reef. Care should be taken in approaching it at high water, to keep a good look for the trees, which should not be approached nearer than 3 or 4 miles till the north end of the trees on Charanka bear S.W. by S., as mentioned above. The trees at a distance have the appearance of high rocks.

To sail up the Gulf. In working from Charanka toward Nowa-Nugga Point, distant 14 or 15 leagues, on the south side of the gulf, after passing Kambalea Point and Reef, do not come under 18 fathoms on the Halla coast or southern shore, particularly in standing towards Karamba Reef, which has 15 fathoms close to, and is 5½ leagues to the E.S.E. of Charanka anchorage. The western side of Karamba Reef is separated from the eastern extremity of Kambalea Reef by a channel about a mile wide, with from 18 to 9 fathoms water in it, where a vessel may anchor about 2½ or 3 miles from the entrance of the small river, or creek of Syrriah, that Fort being about 2½ miles within the entrance: both Kambalea and Karamba Reefs are covered at high water. Jooriah Fort is about 5 leagues E. N. Eastward of Nowa-Nugga Point, opposite to which there are several sand banks, and the water becomes too shoal for large vessels on this side the Gulf. Nowa-Nugga Point is fronted by a reef, on the east side of which a vessel may anchor in 5 or 6 fathoms, to the N.N.E. of the mouth of Nowa-Nugga Creek.

Toona. Toona Creek is on the north side of the gulf, distant about 6 or 7 leagues N.N.W. from Nowa-Nugga Point, and there is no danger in crossing over from the latter to the westernmost creek leading to Toona, there being two creeks, separated by an island or bank covered with bushes, and the westernmost creek is the smallest. With the mouth of this creek bearing N. by W. a vessel may anchor in any convenient depth, over a mud bottom.

Bedressa. Bedressa Fort is about 5 leagues to the W.S.W. of Toona Creek, on the north shore, and in working from hence to Bedressa you may stand in to the shore to 7 fathoms, and off to 24 or 26 fathoms; the same may be done in working from Bedressa to Mundrah, &c. Mundrah, or to Neeveena Point, the latter being 5½ leagues to the W.S.W. of Bedressa, and Mundrah is in the Bay between them, about 2 leagues N. N. Eastward from that point.

Sunnarrah D'hurree is a large sand-bank to the westward of Neeveena Point, between it and Mudwar, having a passage inside for boats. As this sand bank has 12 fathoms close to its southern side, do not come under 14 fathoms towards it in passing, and stand off shore to 20 fathoms, after which it is prudent to work from 9 to 16 fathoms in proceeding to Mandavee Road.

Ranwarrah Shoals. Ranwarrah Shoals are about 8 or 9 miles to the southward of Mandavee, and in coming from the southward towards the latter place, Asseir Pagoda bearing North will clear the west end of these shoals: but as that Pagoda cannot be seen from this situation except in clear weather, it is advisable to fall in to the westward of it, about 3 or 4 miles, where the soundings change from rocks to mud, and the water has a very Directions. muddy appearance. On getting mud-soundings, steer towards the shore till you shoal to 12 fathoms, then haul to the eastward, keeping this depth till past the reef off Asseir, on approaching which, the soundings will change to rocks and sand. When clear to

the eastward of Asseir Reef, you may shoal to 9 fathoms sand, and keep in this depth till the S.W. Bastion of Mandavee Fort bears N. by W., which is a good bearing to anchor in the road at any convenient depth. MANDAVEE FORT is in lat. 22° 50′ N., lon. 69° 22½′ E., by a late survey. Mandavee.

The parts of Ranwarrah Shoals, which are nearly dry, extend about 8 miles East and West, and are about 1 mile in breadth: the soundings on the south side of these shoals are no guide, the water being deep close to them. A vessel may pass about 2 miles to the westward of them coming from the southward, and will shoal from 16 to 7 fathoms at one cast of the lead, after which she will have irregular soundings from 6 to 9 fathoms rocks, and when clear to the northward of these shoals will have 9 fathoms sand. You may borrow towards the eastern extremity of these shoals from 15 to 7 fathoms without danger, but in this case it is prudent to haul out a little to the eastward. When there is any swell, the sea may be seen breaking over these shoals, therefore a good look-out should be kept on approaching them from the southward. Directions.

Throughout the gulf, it is high water on spring tides between 11 and one o'clock; the rise and fall about 14 or 15 feet. Tides.

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# PASSAGES FROM INDIA TO MUSCAT, AND TO THE ENTRANCE OF THE PERSIAN GULF.

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THE MONTHS most favourable for sailing from the Malabar Coast to Muscat, or the Gulf of Persia, are November, December, January, and February. In these months, ships from the Bay of Bengal, Ceylon, or the southern ports on the coast of Malabar, should proceed with the land and sea breezes along that coast, as far as the high land of St. John, in lat. 20° N., which may be sometimes done in ten days. They should then depart from the land, keeping to the N. West as the wind will admit, on purpose to pass near the Guzerat and Gwadel coasts; when abreast of Dui Head, 35 fathoms will be 5 or 6 leagues from the land. Having passed this headland, it will be prudent to continue to keep well to the northward, and increase the lat. to 23° 50′ or 24° N. before they are 11° to the westward of Bombay, if the wind permit; for even in these months, it often hangs far to the northward. With the Gulf of Cutch open, it sometimes blows strong at E. and E.S.E. accompanied by cloudy weather. When the wind is northerly, the sky is clear and serene; when N.E., beware of sudden squalls, indicated only by the rapid motion of a small cloud that accompanies them, giving very little warning. Best time to sail for the Persian Gulf. Directions.

By running down the westing in lat. 24° N., a brisk wind will be experienced, probably until the middle of the Persian Gulf is open, which often sends out a strong north-wester. If bound up the gulf, a ship must keep nearest the Persian Coast, but may bear away for Muscat when bound to that port, which she will reach with the north-west wind without difficulty, by crossing over to the windward of that place. The usual passage from Bombay in these months, is 10 or 12 days.

Ships proceeding on a direct course from Bombay to Muscat in this season, by meet- Calms near Ras-el-had.

ing the winds well to the northward, frequently make the land about Ras-el-had, and if they get near the shore, are liable to calms. Some ships have been 15 days working from the high land of Kalhat to Muscat, against strong north-westers, and a lee current in the offing, and calms near the shore. In these months, the land should not be approached nearer than 5 or 6 leagues, to avoid calms near the coast.

In March, April, and May, a direct course to Muscat is to be preferred, from any part of the Malabar Coast; as the land breezes are no longer to be expected, it is tedious getting to the northward; a ship should, therefore, stand off from the land into the open sea, if to the northward of the Laccadiva Islands, or through any of the most safe and convenient channels between them, if departing from one of the southern ports on the coast. When well out from the land, the sea will be found more smooth than along the coast, and the winds variable, between North and W.N.W., but usually N. by W., to N.W. With these winds she ought to stand to the westward when they are favourable, and to the northward when they draw to the N.W. or W.N.W.; endeavouring to make a direct course toward Ras-el-had, in March, and the early part of April. In the latter part of this month, and in May, it is prudent to get to the westward as speedily as possible, to benefit by westerly and S.W. winds, which may certainly be expected when the gulf leading to the Red Sea is open, or on approaching the Arabian coast; she should then steer to fall in with the land to the southward of Ras-el-had, for about this cape, the S.W. and southerly winds begin in March, or early in April, but blow stronger in May. Inside of Ras-el-had, land and sea breezes prevail in this season, except when they are obstructed by a strong north-wester from the Persian Gulf, which is certain once or twice a month. The coast may be approached in these months within 5 or 6 miles, and 20 days are then reckoned a good passage from Bombay to Muscat.

Winds near Ras-el-had at this time.

Winds in September and October.

In September and October, the passage is very tedious; being the change of the monsoons, the winds are variable between the coast of Arabia and Malabar, but blow mostly from N. Westward, particularly near Bombay, and to the distance of 2 or 3 degrees from the land, these north-westers prevail, with a ground swell at times. A ship in the latter part of September, or October, ought to work up the coast to lat. 19° or 20° N., then stand off, making all the westing possible, as the wind is found to vary; observing, if circumstances admit, not to go to the southward of lat. 19° N., in crossing over towards the Persian Gulf; and endeavour, if bound to Muscat, to make the land about Ras-el-had, where she will meet with variable winds on this part of the Arabian coast. A ship at this season, intending to proceed up the Persian Gulf direct, should keep well to the northward along the coast of Persia, to Cape Jask, and avoid the Arabian shore.

To proceed in these months.

Southern passage.

THE SOUTHERN PASSAGE, from Bombay to Muscat and the Gulf of Persia, is often made by the Company's vessels, and also by merchant ships. It is a track of nearly 1,500 leagues which has been usually adopted, to gain about 260 leagues, the direct distance from Bombay to Ras-el-had. June, July, and August, are the months in which ships leaving Bombay generally use this passage, when bound to Muscat, or the Persian Gulf, and likewise when their destination is to the Red Sea. After working out of Bombay Harbour, and obtaining an offing of 20 or 25 fathoms water, a ship proceeding to the southward along the coast, should keep in soundings from 35 to 60 fathoms, taking care not to come under 20 or 25 fathoms towards the land, nor to deepen off the bank, particularly when passing inside the Laccadiva Islands.

In passing down the coast, strong S.W. and W.S.W. winds and squalls at West and

W.N.W. may be expected in these months, with frequent hard gusts, and heavy showers of rain.

By the time a ship has reached lat. 4° S. it is probable she will be nearly on the meridian of the south end of Ceylon, and may fall in with the S.E. trade wind in June or July, but in August it draws farther to the southward. In these months, many ships run down their westing in 4° to 4° 30′ S., between the southern part of the Maldiva Islands and the Speaker Bank, for in June and July the S.E. trade is sometimes experienced in this track, which is generally called the *Short Route;* but in August, the other track to the southward of Diego Garcia is preferable, by keeping in lat. 9° or 10° S. This track is more certain than the other at all times, as the wind is more steady, and generally much stronger than nearer the equator: ships proceeding by the *Short Route* in June, July, and early in August, have, however, often experienced smooth water, and steady S.E. and E.S.E. winds, to run down the westing in lat. 4° to 4½° S., but in May, or late in August, it is not prudent to adopt this route; for then, the winds are liable to change to the westward, producing a current to the eastward. In the *southern track*, the current generally sets to the westward all the year round, when the trade wind prevails; and this passage to the southward of the Chagos Archipelago seems preferable to the *Short Route*, and more certain at all times, for ships following the southern passage from the eastern parts of India, to Bombay, the Persian Gulf, or Red Sea; or from Bombay to these places.

The Short Route.

When it may be followed.

Southern track preferable.

The navigator should be careful to run sufficiently to the westward, whilst in south latitude. If bound to the Red Sea, it will be prudent to pass near the Seychelle Islands; if to Muscat or the Gulf of Persia, it is advisable to run 1° or 2° to the westward of Ras-el-had, before a ship leaves the S.E. trade; for the winds during the S.W. monsoon, from the equator to the Arabian Coast, generally blow very strong at W.S.W. to W.N.W. with a constant current setting to the eastward. It is, therefore, frequently impossible to make any westing after a ship has crossed the equator, or even to make a north course good; the heavy sea on the beam tends likewise to force her to leeward, sufficient westing should be therefore obtained in south latitude, to enable her to reach Ras-el-had with a west wind, which is the best place to make the land, or a little to the southward of that headland. Care should be taken not to approach the dangerous gulf to the S.W. of Mazeira Island; but when past this island, a ship may haul in as much as the wind will admit, and make the land. On making the land about Ras-el-had, the S.W. wind that blows fresh to the southward of the cape during the S.W. monsoon, veers gradually to the S.E. in passing that headland. When it is brought to bear south, the S.W. monsoon is entirely lost, and light variable winds may be expected from thence to Muscat. Fresh south-easters happen once or twice a month, inside the cape, which continue two or three days, and sometimes blow up into the gulf, but N.W. winds generally prevail.

Where to make the land.

THE DIRECT PASSAGE from Bombay to Muscat, although seldom or ever attempted in heavy sailing ships, has been sometimes performed by the Company's ships of war during the strength of the S.W. monsoon, instead of the circuitous route by the Southern Passage. The Benares, commanded by Lieutenant Haines, left Bombay Harbour June 1st, 1829, did not go to the southward of lat. 15½° N., but kept mostly between lat. 17° and 19° in proceeding to the westward, and arrived at Muscat on the 21st of that month. The new brig of war Tigris, a fast sailer, left the same harbour August 4th, 1829, did not proceed to the southward of lat. 18° N., saw Cape Arubah on the 15th, and on the 23rd arrived at Muscat.

The Direct Passage.

# COASTS OF SINDE AND PERSIA, INCLUDING THE RIVER INDUS.

## COAST OF SINDE FROM THE GULF OF CUTCH TO RAS MOOARREE.

Coast of Sinde. THE COAST OF SINDE extends from the Gulf of Cutch, nearly 80 leagues about N.W. by W. to Ras Mooarree, where the Persian Coast is considered to begin. It receives this name from the river Sinde or Indus, which here discharges itself by Natives. many branches into the sea. The natives having long been addicted to rapine, and being usually hostile to strangers, this coast has seldom been visited by European ships; but lately it has been explored, and most part of it surveyed by the officers of the Bombay Marine.

On the north shore of the Gulf of Cutch, nearly in lat. 23° N., there are several hills, called Chigo, and Asseir or Assar Hills, and Mandivee town to the eastward of them, opposite to which there is anchorage in 6 or 8 fathoms in the road. About 2 or $2\frac{1}{2}$ leagues to the westward of this anchorage, there is a rocky bank extending out from Assar Pagoda, and further to the N. Westward two or three forts, with regular soundings along the shore.

From Chigo Hills, the direction of the coast is about W.N.W. and N.W. by W. 26 or 28 leagues, to the easternmost branches of the river Sinde, having regular soundings stretching along it, and extending a great way out from the shore.

The following account of the Indus is taken from the Official Report, compiled by Lieut. Carless, of the Indian Navy, from the Reports of Lieutenants Carless and Wood, of the Indian Navy, and Lieut. Pottinger of the Bombay Artillery.

State of the branches of the river. "THE RIVER INDUS OR SINDE, as is well known, divides about 50 miles from the sea into two grand arms, the Buggaur and the Setta. During the dry season no communication now exists between the Buggaur and the main stream, a sand-bank having accumulated at the *confluence* 5 or 6 feet above the level of the water. In all the branches diverging from it the water is salt for the greater part of the year, and they are then merely inlets of the sea.

"The Setta or Eastern Arm pursues the same course to the ocean as the great river from which it is supplied, and is in fact a continuation of it. In every part it preserves a similar magnitude, and for a long period has been as it is now the principal channel of the Indus. In its passage to the sea it receives many local names, but it is best known near the coast as the Munnejah or Wanyanee. The Mull and Moutnee are impassable at the point where they leave the parent stream; and nothing is now seen of these once noble rivers but two shallow rivulets, one of which you may step across, and the other but a few yards wide. The Hujamree and Kedywaree are the only two now favoured to any extent by the fresh water, or which possess navigable channels into the

main river; the latter, however, can scarcely be called a branch, but is merely a shallow creek with a broad entrance that quits the Munnejah near its mouth. Above the Delta two more branches are thrown off by the Indus, the Pinyaree and Fulailee, which are rivers only during the inundation; after it has subsided they dry up for miles, and are besides closed by bunds thrown across them above the seaport towns.

"The Indus formerly reached the sea through eleven large mouths, but three of them now suffice in the dry season to discharge its waters. The Kookewaree, which gives egress to the waters of the Munnejah River, is the grand embouchure of the Indus: in the late maps it is called the Gora; but erroneously, for that mouth was deserted by the stream some years ago, and its site is now an extensive swamp. Mouths of the Indus.

"Between the eastern and western mouths the coast of the Delta runs nearly in a straight direction to the N.W. about 125 miles; in the charts it is laid down above half a degree too far to the eastward, and the same error will be found to exist in the delineation of the mouths of the Hujamree and Koree, where the longitude has now been ascertained by numerous observations. The former is in 67° 25′ E., and the latter in 68° 30′ E. Coast of the Delta.

"The shore is low and flat throughout, and at high water it is partially overflowed to a considerable distance inland. With the exception of a few spots covered with jungle, it is entirely destitute of trees or shrubs, and nothing is seen for many miles but a dreary swamp. Wherever this occurs the land is scarcely discernible two miles from the shore, but at those parts where there are bushes it is visible from the deck of a small vessel double that distance.

"On a coast so devoid of objects and sometimes partly submerged, it is often difficult to distinguish the mouths of the different rivers, and but few directions can be given to assist the navigator in finding them. The Seer is known by some sand heaps topped with bushes on its north point, which are sufficiently elevated to be visible some distance. The Cutch pilots call this point Douppe, and always stand in to sight it before they steer for the Munnejah bank. There is a similar spot at the Richel Mouth, which also serves as a guide to approach the Hujamree River two miles below it. Marks for finding the Rivers.

"The bank everywhere projecting from the coasts extends from the Bay of Corachee (Crotchey) to the N.W. extremity of Cutch. In breadth it varies considerably: off the mouths of the Setta, where broad flats have been cast up by the greater strength of the tide, it runs out in some places 5 or 6 miles, and at low water is dry for a distance of 15 miles along the shore: at the Koree Mouth it is of similar breadth, but only dries here and there in small patches. In other parts the outer edge is only two or three miles from the land, and sometimes less; and at low tide it has a depth of water on it, which from $2\frac{1}{2}$ fathoms decreases gradually to 4 or 5 feet. On the bank the bottom is smooth and hard, but outside it is composed of soft mud. The Bank.

"The tides are extremely irregular between the Seer and Mull mouths, 30 miles apart; the currents set constantly to E.S.E., and the flood or ebb can only be distinguished by the rise and fall of water, which is not more than 4 feet. Near the Munnejah bank the ebb runs with some strength directly off shore, and the rise and fall is 12 feet. In other parts, where the channels are numerous, the tides change their direction every hour, and they are scarcely felt at a greater distance than two or three miles from the shore. Tides.

"During the fine season the Sinde Coast may be navigated without difficulty; the soundings are everywhere a sufficient guide, and in general decrease so gradually and with such regularity, that no danger is to be apprehended in approaching it. The only Sinde Coast.

shoal of any consequence is the Great Munnejah Bank, which projects beyond the line of the direct route to the northern rivers. In passing it during the night, large vessels ought not to come under 7 fathoms, for it is rather steep in some parts, and from that depth the soundings decrease very rapidly. Land and sea breezes generally prevail with cold clear weather, but the wind sometimes blows very fresh from the N.E., and the atmosphere is obscured with clouds of dust. The fine season is over long before it terminates on the Malabar Coast, and the navigation becomes very dangerous. Early in February the westerly winds set in with considerable violence, and for the first fortnight the weather is very tempestuous: strong gales are also sometimes encountered in this month, and there is a heavy tumultuous sea continually running, which breaks across the mouths of the rivers. In 1833, the Shannon schooner was caught in one, which lasted 12 hours, and caused the destruction of ten or twelve large boats, which were wrecked on different parts of the coast. Short intervals of fine weather occur afterwards until the middle of March, but after that date the mouths of the Indus may be considered closed for the season.

Hujamree branch of the river.

"Besides the Munnejah or main river, there is only one branch, the HUJAMREE, now available for the purpose of opening a communication with the upper part of the Indus: a trigonometrical survey of it has been completed, and the former has been carefully examined from Hyderabad to its mouth.

"The mouth of the Hujamree opens like a funnel, and, with the exception of that part where the river takes its course along the right bank, is occupied by a broad flat, partially covered with water. This forms a continuation of the bank everywhere extending from the coast, and which is here more than a mile in breadth. The best channel for crossing it runs in a N.N.E. direction towards the north point of the river, and is 600 yards wide: at the entrance there are heavy breakers on either side, and at high water no greater depth is found on the bar than 13 feet. Besides this channel, there is another that crosses the bank in an easterly line, but it can only be used by the smallest boats in moderate weather. About this mouth, which is in 24° 8′ N. lat., the land is entirely destitute of objects that could be pointed out as marks to guide the navigator, and, without the assistance of a pilot, a stranger would have difficulty in finding it. The Cutch boatmen never attempt to steer for it until they have seen the north point of the Richel, which, being covered with mangrove jungle, is visible some distance, and enables them to ascertain their position correctly. There is, however, no danger in approaching it in the fine season, for the soundings decrease with the greatest regularity up to the edge of the shoals, and the breakers on them are visible when in 4 or 5 fathoms water.

"The general course of the Hujamree, or, as it is called in the upper part, Seeahm River, is W.S.W., and its length 40 miles.

"A short distance above the entrance it has a width of 550 yards, which decreases gradually until it contracts to a narrow stream not more than 50 yards broad. Of all the branches, it is the most winding and intricate. Bunder Vikkur, the port, is 20 miles from the sea; below that town the channel occupies about half the stream, and with a few exceptions crosses from side to side at the middle of each reach. The deepest part will generally be found close to the steep banks, and the shallowest whereever they are low, and rise gradually from the water.

"In the lowest part of the river the soundings are very irregular, but at high tide there is nowhere less than 2 fathoms in the deep channel, until you arrive at an extensive bar or flat 19 miles from its mouth, on which not more than 7½ feet water is found.

This is the only impediment that exists below Vikkur, and the large boats that arrive from Cutch and Guzarat are often detained until the height of the springs before they can cross it. Immediately above Vikkur, the river runs in a succession of reaches broader in the middle than at the ends, where they contract so much as to leave a passage barely 80 yards wide. Here it is alternately deep at the angles, and shallow wherever it widens: on the flats the depth varies from 3 to 8 feet, but they are full of holes, and a continuous channel of more than 5 feet nowhere exists.

" Near its junction with the Setta its breadth for many miles rarely exceeds 50 yards, and in the dry season it is easily forded in 6 or 8 different places. The soil brought down by the Indus is a mixture of sand and clay, and rapidly acquires firmness after it has been deposited. On most of the flats, the bottom is very hard in consequence, and this is likewise the case in all the deep channels. In the upper part of the river the current is extremely feeble, but in the lower part the tides influenced by the ocean are much stronger; even there, however, they are not rapid, for their velocity scarcely ever exceeds 3 miles an hour, and is generally much less. At Vikkur the flood is irregular in its approach, and 10 miles above it ceases to be felt altogether. Tides.

"At the mouth there is a rise and fall of 8 feet on the springs, and it diminishes gradually until it is no longer perceptible.

" In its course to the sea, the Hujamree sends off several creeks, which connect it during the inundation with the Richel.

" Amongst the seaports of Sinde, Bunder Vikkur may be considered as next in importance to Corachee. The fort takes its name from a small village in the vicinity, but the town is called Barree Gorah; it contains about 120 houses constructed of reeds and grass. Opposite the town, the river, although not more than 170 yards broad, is deep, there being 4 and 5 fathoms close to the bank; it affords, in consequence, every facility for the discharge or shipment of cargoes. The appearance of the place altogether is wretched beyond description, but it possesses a considerable trade, and has now become a depôt for a great part of the foreign and internal commerce of the Delta. Bunder Vikkur.

" At high water vessels drawing 9 or 10 feet can pass into the Hujamree without difficulty; but none of a greater draught than 7 feet can ascend as high as Vikkur. Boats built for the purpose of navigating it throughout should draw no more than $2\frac{1}{2}$ feet at the utmost; at that depth they could cross the flats in the upper part when the river is at the lowest, and from the weakness of the currents might proceed with rapidity.

" The Kookewaree mouth is about 10 miles below the entrance of Hujamree River. The broad bank that has accumulated before it, projects 5 miles from the land, and is intersected by three channels, which give egress to the waters of the Munnejah; two of them cross the bank nearly in the same direction as the course of the river that supplies them; but the third turning to the N.W. runs some distance in a line parallel with the shore, and after uniting with the channel of the Kedywaree, reaches the sea about 5 miles to the southward of the Hujamree Mouth. This last-named channel is the best of the three, and between 300 and 400 yards broad; at the height of the flood the least water on the bar is 10 feet, but inside the depth increases to 11, 12, and sometimes 14: about half-way up the channel there is a shallow spot, which has barely 9 feet on it in the deepest part, and this the least water obtained throughout. All these soundings were taken at the height of the springs, when the rise and fall is about 5 feet. At the lowest state of the tide, the central parts of the bank are elevated 12 feet above the level of the sea, and the beds of the two southern channels from 3 to 4. The vast The Kookewaree mouth. North channel. Southern channels.

body of water issuing from the Munnejah River rushes through them with great impetuosity; and with a noise that in calm weather is heard at a great distance. They then form what may be termed rapids, and on the extreme edge of the bank terminate in a fall of about one foot. In all these channels, the ebb tide runs at the rate of 4 miles an hour; but the current of the flood, which is only felt for a short time, is very weak, and does not extend more than 4 or 5 miles above the mouth of the river.

"After the first week in February, when the westerly winds have set in, the navigation becomes dangerous, for their entrances are not protected in the slightest degree from the swell, and the sea at intervals breaks right across them. Off the great bank the sea rises higher than it does on other parts of the coast, and it is only from this circumstance that the Kookewaree mouth is accessible.

"Sailing vessels drawing 7 feet water might enter it by the north channel without much difficulty; but their progress depending in a great measure on the wind and tide, they are not so well calculated to navigate it as steamers. From its great length, and the absence of all local marks by which its direction can be ascertained when the shoals are covered, it would be difficult to pass through it without grounding continually, and I should not advise the attempt being made until buoys have been laid down at the entrance, and at short distances throughout its extent.

Main River below Hyderabad.

"From Hyderabad the main stream of the Indus pursues a S.S.W. direction to the ocean, and with the exception of two short bends, one at the part where the Hujamree quits it, and the other below the confluence of the Hujamree branch, its course is rather direct. The distance in a straight line is 90 miles, but by the windings of the stream about 112. The width of its mouth, the Kookewaree, is 1,100 yards, but it quickly decreases to 700, and the channel which runs along the left bank, and is deep, is further contracted to 400 by a flat extending from the opposite side. The bed of the river between Tatta and Hyderabad is full of shoals, and the navigation extremely intricate. At the village of Kuddy its width is 980 yards, but at the angle of the reach in which this village stands, it is not more than 390. Abreast the Pinyaree it increases to 760, and at Triccul, a few miles below Hyderabad, again contracts to 380. The strength of the current here is not more than 3 miles an hour. In this section of the river the depth has not yet been fully ascertained at every part. In the soundings taken across the shallows at certain distances, from 8 feet 4 inches to 7 feet 6 inches, have always been found in some part of the line, and it is highly probable that a continuous channel of this depth exists from Hyderabad to the mouth of the river.

"It is almost impossible to give any instructions for navigating a river so foul and so variable in its character as the Indus; and even if given, they may become entirely useless three months afterwards.

Difficulty of its navigation.

"The navigation of the Indus in the lower part is extremely intricate, but with proper precautions unattended with danger, or any risk of property: unaided by steam it will always be tedious; but even with that power, the time required for ascending it will not be shortened so much as it is anticipated. From the foul state of the river and the strength of the currents in many parts, it is evident that frequent delays will occur. The fair channel is not always to be detected, and when found, not easy to follow. In some places it is extremely narrow, and shifts its position with extraordinary rapidity; none of the boatmen possess a sufficient knowledge of its direction to act as pilots, and in dropping down the river in a dry season are obliged to have a small boat sounding a-head. Even with this precaution they often run aground, where a few

months before they had abundance of water, and much difficulty is at times experienced in regaining the deep channel.

"The branches of the Indus, both within and above the Delta, are either perfectly dry during the greater portion of the year, or they form a series of pools, the resort of fishermen, but unnavigable. By the middle of May its branches are partially refilled—both arms of the Delta open, and at this period of the year the river is characterized by its many mouths. When once the swell begins to subside, the fall during the first few days is sufficient to cut off all communication between the river and its branches. On the 26th of September, 1836, only four days after the commencement of the second or last fall, the Indus above its Delta did not possess one navigable offset. Inundation of the Indus.

"From the head of the Delta to Hyderabad, a distance of about 60 miles, the river during the height of its freshes is confined to a well-defined channel. Its bed is full in some places, partially overflowing, but in the immediate neighbourhood of the river throughout the tracts in question the fields are watered by the Persian wheel. It begins to rise on the 23rd of March, and to subside on the 22nd of September, it is at its maximum about the beginning of August. Its height is then 15 feet 3 inches. There is also another rise on the 23rd of September, the height of which is 13 feet $11\frac{1}{2}$ inches; it varies with the width of the river, and the same may be said of the current. The maximum strength of the current is 7 geographical miles an hour; while the river is rising its strength is greatest; a fall of but a few inches even at the height of the freshes occasions a sensible diminution of its velocity. From Tatta to Hyderabad the general width of the river during the swell is about three-quarters of a mile. To this there are three exceptions: the first occurs at the end of the second reach below Hyderabad, the second at Bunna, and the third at Tatta. At each of these places the stream runs in two channels, and when the island so formed is under water, the river has more the resemblance of a large lake than a running stream. The mean depth at the height of the inundation is 23 feet 3 inches. The freshes, at their commencement, are recognized more in the increased velocity of the current than by the enlargement of their streams, of which neither the width nor depth are proportionably augmented. The discharge for April is double that of March, though the appearance of the river has undergone little change. It is otherwise with its channel, in which the first increase effects a change for the better. Shoals disappear from mid-channel and accumulate in extensive flats along the shore. By the 1st of May the channel is tolerably clear. The current of 7 miles an hour is no hinderance to the navigation of the river during the height of its freshes. Close to the banks it is much weakened, and country boats with a moderate breeze make good progress against the stream. From the 10th of October to the middle of March, strong northerly winds prevail upon the Indus: boats acending the river in these months must be dragged up by the track rope. Throughout the other months of the year, the wind generally blows strong from the S.W., but does not penetrate higher than Seeahn, a town about 212 miles from the sea. Above this town, throughout the year, vessels bound to the northward have no other means of advancing but that of tracking." Extent of inundation.

During Mr. Wood's stay at Hyderabad, he endeavoured to collect the most authentic information of the capabilities of the river in the winter months above that city. The result is, that the Indus about Mittun at that season has no permanent channel, but runs in detached streams, which renders its navigation difficult; but that from Hyderabad to the northern frontier of Sinde the river is of easy navigation, has abun- State of the river in the winter months.

dance of water, and is altogether much superior to the section of the river below the capital.

Hyderabad and Tatta contrasted.

To those who may contemplate the frequent navigation of the Indus for commercial purposes, it may be important to remark, that Hyderabad enjoys a situation very superior to Tatta as respects the salubrity of the air. The first-mentioned town is built on a rocky table hillock, 80 feet high, about a mile and a quarter long, and 700 yards (as paced) broad. Its distance from the Indus in a direct line is 3 miles, and no high land intervenes to intercept the breeze cooled by the river from exerting its most salutary influence. The general healthiness of Hyderabad, however, is more ascribable, perhaps, to its elevated position than to its vicinity to the river. It is seated above the influence of the miasma arising from the pestilential swamps which surround it. The exhalations are carried beyond the suburbs before they can ascend to the plateau on which the town is built.

The site of Tatta, on the contrary, though somewhat above the level of the surrounding country, is not sufficiently high to raise it above the noxious vapours which must be generated by the stagnant water which in the month of September almost surrounds the city. The rain that falls at Tatta, lodges between the mounds of earth which are everywhere seen, (the ground being extremely broken) and must be another fruitful source of disease.

Tatta, it is believed, has suffered greatly in her commercial relationships from this cause, while Hyderabad, from its more favourable situation, may look forward to an increasing commerce.

It should, however, be stated, that from the day the inundation of the river begins to subside, the country becomes unhealthy, and the latter part of the month of September (*i. e.* the period from the 23rd) and the whole of October are considered the most dangerous season of the year. It is then that the change of the monsoon takes place, and the exhalations from the rice fields are most to be avoided.

Crotchey.

CROTCHEY or KORAUCHEE, entrance in lat. 24° 46′ N., lon. 66° 55′ E., is easily known by several islets, and a white tomb or pagoda, built on the promontory which bounds the west side of the harbour, and which at a distance appears like an island. The bar, on which there are about 1 and $1\frac{1}{4}$ fathoms at low water, and 18 or 19 feet at high water, spring tides, extends across the entrance from the promontory to the islets, which is the proper channel; but in case of necessity, a small vessel may pass, or anchor between any of the islets, where the bottom is sandy, as it is all over the bay or harbour. To anchor in the road outside, the tomb at the entrance should be brought to bear about N.W. by N., to avoid the foul ground. There is a heavy swell on the bar in the S.W. monsoon, rendering it dangerous in this season.

The town of Crotchey is 5 or 6 miles from the anchorage, and about a mile from the side of a small creek, which can only admit small boats. At this place, a considerable trade was formerly carried on; the exports, cotton, almonds, raisins, dates, ghee, oil, and hides, and some piece goods; in return, sugar, rice, pepper, &c. used to be imported. Cattle and goats may be procured, but at higher prices than at Sinde.

The water is very indifferent, and it is dear on account of its being brought from a considerable distance. At this place, the inhabitants were formerly civil to strangers, but it is not frequented by Europeans.

About a mile inside the bar there is an extensive bank, dry at low water, between

which and the western shore is the channel up the bay or harbour, and the general depths in the fair track along that side of the bay are from 2 to 4 fathoms at low water. The tide flows to 11¼ hours on full and change of the moon. Tides.

The following directions for the harbour have been published by Lieut. Sharp, commanding H. C. brig of war Euphrates, in the Bombay Gazette, 12th March, 1839.

"Steer for the islands to the eastward of the harbour, bearing about N.N.E., and keep the Pyramid a little open of the South Island, till the Red Nun Buoy, placed on the verge of the spit in 12 feet low water, is seen, when you may haul up for it, and bring the Black Beacon, situated N.W. by W. a quarter of a mile from the Round Tower, in one with the Tower, which is the leading mark for the fair channel up the harbour." Directions for the Harbour by Lieut. Sharp.

"The Black or Nun Buoy is placed on the northern sand, in 12 feet low water."

"A Cask Buoy is placed on a line from the Red Buoy to Pyramid Island, and shows the width of the channel."

"The flood tide at the outer Buoy sets across the channel or to the N.E., but beyond the Black Buoy it sets fairly up the harbour."

"The ebb tide takes the direction of the channel."

The land about Crotchey has a white appearance, and is of considerable height in the country, extending in a chain of hills toward Ras Mooarree, which bears from the entrance of the harbour about W. by N., distant 5 leagues; but the land between them, which fronts the sea, is very low, and not seen except when near the shore.

## SOUTH COAST OF PERSIA FROM RAS MOOARREE TO CAPE JASK; CALLED THE COAST OF MUKRAN.*

RAS MOOARREE, called also CAPE MONZE, in lat. 24° 51′ N., lon. 66° 35′ E., is of moderate height, having a bank projecting 2½ miles from it on the south and S.W. side, with depths of 3 to 5 fathoms rocky ground. The Island Chilney, or Churna, is of a whitish colour, situated 4 or 4½ miles to the N.W. of the cape, having a channel of 6 and 7 fathoms, about a quarter of a mile wide, between it and the bank that lines the coast. Ras Mooarree.

From Ras Mooarree to Soonmeany River, the distance is about 11 leagues, and the direction of the coast nearly north, forming a bay; it is low close to the sea, and high inland, with tolerably regular soundings off it, chiefly mud.

Near the shore, about 4 leagues to the northward of Ras Mooarree, there is a large flat rock several feet above water, having 5 and 4 fathoms close to it all round; and a ship may, in working along shore, venture to stand well in, keeping the lead going until Soonmeany is approached, where shoal water extends out to a considerable distance, the bank in some parts being dry at low water.

SOONMEANY, or SONMEANY,† is a small town of huts, constructed with mats and poles, situated near the mouth of Poorally River, which is scarcely seen from the road, but in clear weather the place may be known by a remarkable gap in the high land, which cannot escape notice. When this gap bears N.N.E. ½ E. the river's mouth will bear N.E. by E., distant about 2½ miles, from the anchorage of 4 fathoms Soonmeany.

* Chiefly from the survey of Lieutenant Porter; and the geographical positions are corrected from the excellent survey of Captains Brucks and Haines, of the Indian Navy, in 1829. It was formerly called the Gwadel Coast by geographers.

† Soonmeany Bay is formed by the projection of Ras Mooarree to the southward, and was called by Nearchus, the Port of Alexander; where he remained some time at anchor with his fleet.

in the road. There are 2 fathoms on the bar at low water, with 5 or 6 fathoms where the boats are sheltered inside.

Every article of refreshment is here very scarce; even the water, which is indifferent, cannot be procured in sufficient quantity, nor without considerable trouble. It is got by digging holes 3 or 4 feet deep, a little above high water mark, and should be drawn off immediately. If the water oozes through the sand, which does not always happen, it will serve that day, and perhaps the next, but soon becomes quite brackish.

Coast to the westward.

From Soonmeany River, the coast takes a direction nearly West, about 34 leagues to Cape Arubah, and is safe to approach by the lead; there are several villages in the intermediate space. It is low near the sea to the westward of the former place, but high and craggy inland, and continues so to Kutcherie, which is about 14 leagues from Soonmeany River. To the eastward of Kutcherie, there is a place called Arrah; between them, in a kind of valley, a mound of high white land is situated, which is a good mark for this part of the coast.

Kutcherie.

KUTCHERIE, or CUDJERAH, at a considerable distance, appears to be a low point, but it terminates in a bluff: when 5 or 6 miles to the westward of it, the rocks of Kingool or Hinglah are seen, appearing, unless very close in, to be separated from the coast; but they are situated on the edge of a low sandy point. The shore all along is bold and safe to approach, the bank extending about 4 leagues off, from whence it shelves suddenly from 25 or 30 fathoms, to no ground.

In coasting to the westward from Hinglah, another point, called Ras Malan, or Muran, is discerned.

Cape Arubah.

RAS ARUBAH, or OREMARRAH, in lat. 25° 7′ N., lon. 64° 32′ E., may be seen from Ras Malan, appearing like an island, it being a peninsula projecting far into the sea, forming a large bay on each side. That on the east side is safe, having regular depths of 6 and 7 fathoms, decreasing to 3 and 4 fathoms near the shore, with a rivulet called Kore Gorad, or Jerkamutty, a little to the eastward. The bay on the west side has shoal water, and is destitute of shelter, from South and West winds. The land about it is very remarkable, and for 4 or 5 leagues to the westward, craggy and uneven.

Astola Island, and adjacent coast.

ASTOLA ISLAND, APPTTALLAH, or SUNGADEEP, in lat. 25° 7′ N., lon. 63° 47′ E., bearing West from Cape Arubah, distant 13 leagues, is 3 miles long East and West, of moderate height, and even appearance, having at 2 miles' distance on the south side, a rock resembling a sail when seen at a distance, but on a near approach, it has some similarity to a camel lying down; between which and the island there are soundings from 4 to 7 fathoms, and overfalls from 9 to 18 fathoms, to the distance of 2 leagues outside the rock.

On the north side of the island, there are two or three sandy bays, supplying great quantities of turtle, and shoals of sand project 1 and 1½ miles from it on that side: between it and the main, the channel is safe, about 2½ leagues broad, with regular soundings from 5 to 8 fathoms. To the N.E. of the island, on the main, is the river Kore Kalmat, which will hardly admit a small boat, the bar at the entrance being very shoal. The coast hereabout is craggy and uneven, without any thing remarkable.

RAS PACENCE, or PASSEENCE, in lat. 25° 11′ N., 6 or 6½ leagues to the westward of Astola Island, appears like a barn in coming from the eastward, and forms a deep bay on its eastern side, where a village of the same name as the cape is situated, chiefly inhabited by fishermen. Water is procured here in the same manner as at Soonmeany, and a few lean goats may be obtained at a high price. Ras Pacence and village.

After passing Cape Pacence, the bluff point Ras Sheid is seen, situated in lat. 25° 12′ N., lon. 62° 53′ E., which forms the western extreme, and appears like an island, the high land of Durraam at the same time showing like another island. Between the former and Ras Sheid, the coast is low, appearing like a deep bay until closely approached. Muddy or Clay Peak, which forms the north extreme of Gwadel Bay, is very high, of a white colour, and may be seen at a great distance; it is a very conspicuous piece of land, and an excellent mark for this part of the coast. Ras Sheid.

Two mounts, named the Barn and Funnel, lie several miles inland, to the N.E. of Gwadel Bay, forming part of the high land of Durraam.

The soundings are regular along the coast, the bottom usually mud, or black sand and clay.

RAS NOO, or CAPE GWADEL, the S.W. point of Gwadel Bay, is in lat. 25° 4′ N., lon. 62° 17′ E. It forms a peninsula of moderate height, 6 miles in length, E.S.E. and W.N.W., which is joined to the main by a neck of land not a half a mile over. A wall fortified with towers formerly extended across the isthmus, to protect the town from assaults by land; the ruins of which, also of some wells, and of a town built with stone, are to be seen, but the few inhabitants now live in a town, composed of mat-houses, on the north side of the cape. Cape Gwadel, and contiguous coast.

Water is got here, in the same manner as at Pacence and Soonmeany, that procured from the built wells being brackish; a few goats, sheep, and fowls, may be purchased. The natives are mostly employed in manufacturing dark narrow checks, and some plain carpets of various colours. Supplies.

GWADEL BAY is sheltered from S.W., West, and North winds; the bottom is chiefly sand, free from danger, and the depths, from 10 or 12 fathoms at the entrance, decrease with tolerable regularity into the bay, where the water shoals from 6, to 5, 4, and 3 fathoms.*

Off Ras Noo, the current in January was found to set eastward. Current.

The Circular Bay formed on the west side of Ras Noo, between it and Ras Pishk, is 2½ or 3 leagues wide, and nearly of the same depth, with regular soundings of 8 and 7 fathoms at the entrance, to 6, 5, and 4 fathoms inside, all mud bottom, and it is sheltered from all winds except those blowing between E. and S.S.W. There is a remarkable Notch or Cleft in the mountain, a few miles inland, and directly North from the bottom of this bay. The coast is of moderate height, but the interior hereabout is rugged. The soundings being usually regular over a bottom of mud, render the shore safe to approach, with common prudence.

GWETTER is about 3 leagues deep and 5 leagues wide at the entrance, where the depths are 6 or 6½ fathoms, shoaling to 4, 3, and 2 fathoms near the shores. Gwetter Bay.

Ras Jewnee, in lat. 25° 2′ N., lon. 61° 40′ E., forms the East point of the bay, and

* From Crotchey to this place, the people call themselves Belooches, or natives of Beloochistan, and from hence to Cape Jask they take the name of Brahooes, although their manners and dress appear similar, but in language they seem to differ a little.

when off it, no land on the west side of the bay is discernible, except a hummock or two, which appear like islands. The land at the head of the bay, being very low and covered with shrubs, is not seen till within a few miles of it, and then the bushes first appear.

Gwetter village is at the N.W. side of the bay, and Jewnee village about 2½ miles within the point of this name on the eastern side, the shore between them being fronted by a reef.

In crossing the bay from Ras Jewnee, a small hill, situated on the high land of Ras Farsah, the west point of the bay is seen, and about half a mile East of the point, there is a small island, which cannot be distinguished till near it. Inside this island to the northward of the point is a small bay, called by the natives Farsah Bunder, or Bucker Bunder,* where they go to fish. When round Ras Farsah, craggy land will be perceived, and to the westward of it a remarkable round hill.

From Ras Farsah to Charbar a vessel should keep near the shore, which is safe to approach, that she may anchor if it fall calm between the land and sea breezes, to prevent being driven to the eastward by the current. On this part of the coast, the bank of soundings extends only a little way, but the depths are regular in keeping along shore, and the bottom mostly sand or ouze. The current in January was found to set 2 knots per hour to the eastward, but much stronger out, than in shore. From the hills last mentioned, the land is of moderate height several leagues, the coast having a direction about West and W. by N.

Current.

Charbar Bay.

CHARBAR, or CHEWABAD BAY, is of circular form, about 3 leagues in diameter, and Ras Charbar, its eastern point, is in lat. 25° 16′ N., lon. 60° 35′ E.† This bay is one of the best on the coast, and is about 14 leagues to the westward of Gwetter Bay; the entrance is between Coolab, or Maleddam Point, on the west side; and the low point Ras Charbar on the East. The town, composed of straggling mat houses, stands near the low point, and near it a white tomb and some trees, which in approaching are perceived sooner than the town. A spit of rocks‡ projects from the low point, which must have a berth; but Coolab high point may be passed within a moderate distance when entering the bay, it being safe to approach, where ships may anchor in 4 or 5 fathoms. Fresh water of good quality is easily procured, being near the shore; goats and sheep may be obtained, but neither bullocks nor poultry are to be had. Some small gardens produce turnips, onions, potatoes, carrots, brinjalls, &c. They have very fine horses, and a few camels. This town, although very indifferent, is the best on the coast, where are settled several Banians, and the inhabitants, like those of Gwadel, are mostly weavers. Farther up the bay, on the same side, are the ruins of the town of Teiz, or Tearsa, where the Portuguese had formerly a settlement. From this place, round the bay to Point Colab, the land is very low and covered with shrubs, but the country hereabout is generally dry, barren, and unfruitful, seldom

* This is said to be one of the places which the pirate vessels from Guzarat frequented in the fair weather season, to plunder the dingies, or other small vessels, trading on this coast. These pirate Gallivats came from Bate, Nova-Bunder, Jaffrabat, and other ports on the Guzarat coast. They roved along the coast of Sinde and Persia, and about the entrance of the Persian Gulf, boarding and plundering every small vessel they were able to master. They were successful in getting possession of several brigs, trading from Bombay to the Persian Gulf, and treated with great cruelty the commanders and officers of those vessels.

† Captain C. Sealy in 1809 made Charbar Town in lon. 68° 45′ E. by chronometer from Muscat.

‡ This does not appear by the chart.

having the benefit of rain: famines, therefore, are liable to happen, which force the inhabitants in great numbers to desert the country.

The small bay, where the town of Charbar is situated, has regular soundings, with sandy bottom. To the northward of Ras Teiz, the depths decrease quickly to 2 and 1½ fathoms, on an extensive rocky bank, fronting the east side of the bay; but the soundings are regular near the head of the bay, and on the western side, where there is good shelter under Colab headland from westerly winds, which sometimes blow very strong. The tides rise about 10 feet on the springs; high water about 6 hours, on full and change of moon. Tides.

RAS GODEIM, in lat. 25° 19′ N., lon. 60° 10′ E., or 5½ leagues to the westward of Ras Colab, is the western extreme, visible from the latter place, and forms the S.W. side of Possem or Fuzzem Bay. It appears, when first seen, like an island, and is a headland, level at the top with steep cliffs towards the sea, the contiguous land being very low. The coast from Ras Colab is of moderate height, till it terminates in a remarkable bluff, called Ras Fuzzem, the eastern extreme of Possem Bay, in which the depths decrease from 5 or 6 fathoms at the entrance, quickly to 2 and 3 fathoms inside. About 2 miles S.E. from the west point of the bay, there is a rock nearly even with the water's edge, having 7 fathoms near it all round, and a small rocky spit projects from Ras Godeim to the southward. The land round Possem Bay is low, but inland there are some craggy hills, of considerable height. Ras Godeim. Possem Bay.

From Ras Godeim the coast extends 5 or 5½ leagues about W. by N. to Ras Tank, which has a small river of the same name on its eastern side, with 2 fathoms water at the entrance, but the soundings are very irregular, and mostly hard sand. About 3 miles up the river there is said to be the ruins of a Portuguese fort, with some wells. Ras Tank and River.

Ras Tank has a reef of rocks extending West and N.W. to the distance of nearly 3 miles from its western side.

A little way inland, to the W.N.W. of Ras Tank, is situated the land of Kalal or Coelat, which is high and remarkable.

RAS MUNDANNY, in lat. 25° 24′ N., lon. 59° 1′ E., and distant 16 leagues W. ½ N. from Ras Tank, has a reef projecting 2 miles from it, in a S.W. and westerly direction, with soundings of 3 and 4 fathoms close to it, and 7 or 8 fathoms about 3 or 4 miles outside. Ras Mundanny.

From Ras Mundanny to Ras Zegin, the coast extends nearly W. by N., about 17 leagues, the land generally low near the sea, consisting of jungle and swamp in some places. The soundings along the whole of the coast, from Charbar to Mucksa, are regular near the shore, but a little to the eastward of this cape, and in some other parts, the bank extends only a few leagues from the land.

RAS ZEGIN, or CAPE MUCKSA, in lat. 25° 34′ N., lon. 58° 4′ E., is a low point of land, having a sharp-peaked hill to the eastward, and 12 leagues inland to the N.N.E., the high mountain of Choues or Shouse, which may be seen at 20 leagues' distance. On the west side of this cape, the coast forms a large bay, with regular soundings, affording better shelter from north-westers than Jask Bay. Ras Zegin, or Cape Mucksa.

CAPE JASK, in lat. 25° 38′ N., lon. 57° 48′ E., by the late survey of Captains Brucks and Haines, is distant from Ras Zegin about 6 leagues, bearing from it Cape Jask.

nearly W. by N., and is considered the headland that bounds the entrance to the Gulf of Persia on the eastern side. The shore between them is low; but high and uneven inland. Cape Jask is a low sandy point, with the ruins of a mosque on it, which cannot be perceived until closely approached. Within 3 miles of the point, the depths are 16 and 17 fathoms, and 3 leagues off, 50 to 60 fathoms, from whence the bank shelves off very abruptly to 100 fathoms, no ground. A sandy shoal surrounds the cape to the distance of about a quarter of a mile.

Jask Bay.

JASK BAY is formed on the N.W. side of the cape; it has regular soundings in it, except near the shore on the eastern side, where the water is shoal, from the cape point to the mouth of a small river, or creek, that lies 3 or 4 miles to the northward. The bottom of the bay is soft, and the depths decrease gradually to 5 fathoms in the middle of the bay, where a ship may lie sheltered from northerly or easterly winds, with the cape point bearing about S.S.E. distant $2\frac{1}{2}$ or 3 miles; but it is open to westerly and southerly winds. A good berth is in $4\frac{1}{2}$ or 5 fathoms mud, with the peak of Quoin Hill bearing N. 12° W., Cape Jask, S. 22° E., and the trees at the watering place S. 57° E.

The river or creek on the east side of the bay is almost closed up with banks, but there is said to be a channel over a bar where the depths at low water are 4 and 5 feet, and 2 or 3 fathoms inside the river.

Fresh water.

A little to the south of the creek, fresh water is got from the wells, by digging in the sand 6 or 8 feet deep, close to three trees. The Mornington and Ariel, Bombay cruizers, filled up their water here in November, 1809, and procured some goats from the fishermen who reside at this place.

Tides.

It is high water at 6 hours, on full and change of moon; rise of tide 6 or 7 feet. Variation 3° 0′ W. in 1819.

From Cape Jask the coast extends in a W.N.W. direction to Cape Kerazee about $8\frac{1}{2}$ leagues, before it turns round to the northward.

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# WESTERN COAST OF INDIA, FROM BOMBAY TO CAPE COMORIN.

## COAST OF CONCAN.

Coast of Concan.

ALTHOUGH the western side of the Peninsula of Hindoostan is generally called the Malabar Coast, this appellation belongs properly to the southern part, for the whole extent comprehends three provinces, the northernmost of which is CONCAN, extending from Basseen River to Cape Ramas; the north part of it, which includes Bombay Harbour, has been already described.

Coulaba Island.

COULABA ISLAND, in lat. 18° 37′ N., bearing S.S.E. from Kundaree Island, distant 7 miles, is situated near the shore at the entrance of a river, having 3 fathoms water within it: these two islands and Ondaree formerly belonged to the Mahratta pirates, and are well fortified.

About 3 miles S. S. Westward from Coulaba Island there is a rocky bank, part of it dry at half tide, having 5 fathoms at low water outside, and 3 or 4 fathoms within it; a ship ought not, therefore, to approach the shore here in the night, nearer than 6 fathoms at low water.

CHOUL HARBOUR, in lat. 18° 32′ N., is 5 miles farther to the S. Eastward, having 3 fathoms water at the entrance, which is protected by a fort on each side, and inside there are 6 and 7 fathoms. This harbour was also formerly possessed by the Mahrattas. Choul Harbour.

The high land of Choul is even, forming a bluff to the northward; a little farther towards Bombay, the south part of the high land of Thull appears in undulating hummocks. Off Choul, the fishing stakes lie out in 6, 7, or 8 fathoms water, in the fair season.

RAJAPOUR HARBOUR, in lat. 18° 16′ N., is distant $5\frac{1}{2}$ leagues from Choul entrance; the coast between them, extending nearly North and South, with some small windings, is safe to approach, the soundings 4 and 5 fathoms 1 or 2 miles from the shore. This is an excellent harbour, without any bar, having from 4 to 5 fathoms in the entrance, and the same depths inside, at low water, where there is shelter from all winds. It is defended by two fortified islands, Gingerah in the entrance, and Cassah a little farther out. The channel is to the southward of these islands, but there are 4 fathoms water between them, and also between Cassah and the northern shore. Rajapour Harbour.

The south point of the harbour is called Rajapour Point, and has off it, at more than a mile distance, a reef of rocks partly dry at low water, called the Whale, with $5\frac{1}{2}$ fathoms soft ground close to its north end, from whence Gingerah Fort is just open with Rajapour Point bearing N.E. by E. The Whale Reef is nearly a mile in length, shelving gradually at the south end, and is from 200 to 300 yards broad, with a channel of 4 fathoms inside. A large ship ought not to approach this danger nearer than 8 or 9 fathoms in the night, for the rise of tide on the springs is 12 feet, and it flows to 11 hours on full and change of moon. Whale Reef. Tides.

COMRAH BAY is 6 miles distant from Rajapour Point, the coast extending nearly South, and may be approached to 5 fathoms; in this bay, a ship may anchor in 4 or 5 fathoms, within 500 yards of the shore, sheltered from N.W. winds. From this place the coast takes a direction nearly S.S.E. 6 leagues to the entrance of Bancoot River, and is safe to approach to 5 fathoms. To the southward of Comrah Bay there is a rock near the shore, and to the northward of Bancoot is Severdon small bay and creek, affording no shelter, the latter only navigable by boats near high water. Comrah Bay.

Opposite to this part of the coast, distant 8 or 9 leagues, in about lat. 18° N., lies the southern extremity of DIRECTION BANK, which extends nearly parallel to the coast to lat. 18° 40′ N. This bank is generally composed of sandy bottom, mixed with small shells; the soundings on it are irregular, from 20 to 26 fathoms on the southern part, from 24 to 28 on the middle part, and from 27 to 36 fathoms on the northern part. Inside of its southern extreme there are from 27 to 25 fathoms soft ground, decreasing regularly toward the shore; inside the middle part 30 and 32 fathoms, and the depth inside the northern part nearly the same as on the bank; but all the soundings within it are soft, and decrease gradually to the shore. The broadest part of this bank appears to be in lat. 18° 17′ N., where on its inner edge there is 24 fathoms 7 leagues from the Direction Bank.

land, and from 20 to 25 fathoms at the distance of 14 leagues from the land, where the water deepens suddenly from 24 or 26 to 43 and 44 fathoms.

From the Island Kanary to Bancoot, the depths are 15 and 16 fathoms from 3 to 4 leagues off shore; the land to the southward of Choul is generally high, uneven, double land.

Bancoot River.

BANCOOT RIVER, in lat. 17° 57′ N., and $11\frac{1}{2}$ miles E. of Bombay Castle by chronometer, has 10 feet on the bar at low water, and the rise of tide is 11 feet on the springs; high water at 11 hours on full and change of moon. The channel is on the eastern side the entrance of the river, but being narrow, it ought not to be approached without a pilot. Fort Victoria is situated on a high barren hill, of reddish appearance on the south side the entrance, but is not easily distinguished, as it resembles a tuft of trees; the north side of the entrance is formed by a round mount close to the sea, called Harrissa Hill, conspicuous when seen from the southward, and generally a shade darker than the other land. Inland, about E. by N. from the entrance of the river, there is a long piece of flat table land, by which, in clear weather, this place may be known from the offing, and all the land is high on both sides of the river. A ship may anchor in 5 fathoms, at low water abreast the fort, in fine weather, and get supplied with poultry, bullocks, &c. Off this place, the tides begin to be perceived, increasing in strength abreast of Choul, when a ship keeps near the shore, in proceeding to the northward.

Fort Victoria.

In the latitude of Bancoot River, the bank of soundings extends 40 leagues from the coast.

Severndroog Island.

SEVERNDROOG,* a low island, with a fortified wall around, is situated near the shore, in lat. 17° $47\frac{1}{2}'$ N., bearing S.S.E. from the entrance of Bancoot River, distant 4 leagues. The coast between them is clear to 5 fathoms, but under that depth there are a few patches of hard ground, with 3 fathoms water on them, situated to the southward of Bancoot River, and near the Village and River Kelsey, which is 4 miles from the former place.

Angenweel, and the neighbouring coast.

ANGENWEEL RIVER, in lat. 17° 34′ N., bears about S. by E. from Severndroog Island 4 leagues; between them, the coast is high and safe to approach to 5 or 6 fathoms, these depths being near the shore in some places. Nearly mid-way there is a point of land, formerly called Cape Z, and close to it the Village Bogbrandie; a little nearer Angenweel is the small Bay and Village of Colter, where there is a rivulet of good water. Angenweel River is about a quarter of a mile wide at the entrance, with $2\frac{3}{4}$ and 3 fathoms on the bar outside, and 5, 6, or 7 fathoms in the entrance, near the fort on the south point. The sand on the north shore projects about a mile to the S.W. towards the Fort, and is dry at low spring tides, leaving only a narrow channel close along the south shore: inside, the river is wider, extending a great way inland to the eastward, with depths from $4\frac{1}{2}$ to 8 fathoms, and forms an excellent harbour for small vessels. The village of Angenweel is on the shore of a small bay to the eastward of the south entrance point.

From this place the coast extends about S. by E. 3 leagues to Boria Point having 5 and 6 fathoms regular soundings very near it.

Boria Point, &c.

BORIA POINT, in lat. 17° 25′ N., is a high, round, bluff headland, with a small

* Severndroog, and the adjacent forts, were formerly in possession of a nest of pirates.

pagoda on its highest part, and forms the northern extreme of a large bay. This point is steep, there being 6 and 7 fathoms very near the shore. Along this part of the coast, the land appears broken by several bluff points, with small bays between some of them.

ZYGHUR POINT, in lat. 17° 16′ N., lon. 73° 14′ E., or 20 miles E. from Bombay Castle by chronometer, bears S. by E. from Boria Point, distant 3 leagues. The bay formed between Boria and Zyghur is nearly 2 miles deep, and 6 miles broad, with regular soundings of 5 and 6 fathoms, except at the entrance of Zyghur River, opposite the fort, a reef of rocks projects about half a mile from the northern shore. The fort is near 2 miles inside the outer point, on the southern shore of the bay, and the bar, having $2\frac{1}{2}$ fathoms on it at low water, is close under the fort, within a cable's length of which is the best channel. Within the Fort Point, the water is deep on the south side of the river, forming a safe harbour for shipping against all winds. Zyghur Point, in coming from the southward, has a level appearance, of moderate height, covered with trees. Zyghur Bay.

From Zyghur Point, the coast extends about S. by E. $\frac{1}{2}$ E. 7 miles to a bluff headland, having under it to the northward a cove or small bay, which seems to afford good shelter to boats or small vessels against southerly winds. About 7 miles farther, nearly S. by E., there is another headland, of high, round form, lighter in colour than the other land, and which appears like an island when seen from northward or southward. On the north side of this headland there is a large bay, affording shelter from southerly winds; and on the south side, between it and Rettna-Geriah, lies another bay, about $1\frac{1}{2}$ miles broad and 2 miles deep, with 5 and 6 fathoms sandy bottom. Coast to Rettna-Geriah.

RETTNA-GERIAH, or FALSE GERIAH, in lat. 17° 2′ N., is a neck of land fortified all over, and forms the south side of the bay last mentioned: the landing-place is on the north side the fort, where there seems to be shelter for small vessels during the S.W. monsoon. When viewed at a distance, this place appears insulated,* flat and level like a wall, excepting the northern part, which is highest and covered with trees. Rettna-Geriah, the bays and coast adjacent.

On the south side this neck of land, a large bay is formed, from whence a river, capable of receiving small vessels over its bar at high water, extends a great way inland, having on the north side the entrance a small round tower on the brow of a hill. At the south extremity of this bay there are some rocks above water, about half a mile from the shore, and a little farther southward, a remarkably large Banyan Tree† may be discerned on a hill near the sea. To the southward of this, and 8 miles from Rettna-Geriah, there is a small bay on the south side of a point of land.

RADJAPOUR FORT, in lat. 16° 47′ N., bears from Rettna-Geriah about S. by E. distant 5 leagues, and is situated on a barren hill, on the north side of the river, which trends to the north-eastward. The hills on the south side are covered with trees, and close by the river, on this side, stands a remarkable white pagoda, hence Radjapour Point was formerly called Pagoda Cape. Radjapour.

* It is said to be insulated at high water, the tide flowing over the low neck of land that joins it to the main.

† This Banyan Tree is ancient, having long been conspicuous to navigators. It is placed on several old charts, one of which is that published by John Thornton, in 1700.

Geriah Harbour.

GERIAH POINT (the flagstaff) is in lat. 16° 31′ N., and the fort at the entrance of the harbour about a mile farther northward. The Point, which forms the south side of the entrance, is high and bluff, bearing south from Radjapour Point 5½ leagues, and is 27½ miles East of Bombay Castle. This is a projecting part of the coast, the land receding both to the northward and southward. The flagstaff stands on the hill to the southward of the fort, and may be seen at a considerable distance. This place, although not frequented by Europeans, has an excellent harbour, the anchorage being land-locked and sheltered from all winds. There is no bar at the entrance, the depths being from 5 to 7 fathoms, and from 3 to 4 fathoms inside, at low water; the rise of tide is about 6 or 7 feet.

Tides.

Soundings and general aspect of the coast.

From Zyghur to this place, soundings extend a degree from the land; about 6 or 7 leagues from it, the depths are 30 and 32 fathoms; about 2 leagues off, 14 or 15 fathoms; and in many places, particularty about Rettna-Geriah, and from thence southward, there are 8 and 9 fathoms within a mile of the shore. The coast in general is moderately elevated, but inland the country is higher.

Angria Bank.

ANGRIA BANK bears West from Geriah, distant 24 leagues, and extends from lat. 16° 18′ to 16° 38′ N., being about 10 miles in breadth East and West. The depths generally found on it have been from 13 to 15 fathoms rocky bottom, or hard ground. Although 12 fathoms was the least water that Captain McCluer found in traversing over it, with the depths mostly regular, it seems probable there may be rather less on some parts of this bank, considering its extent.

It is steep all round; near its inner edge there is marked no bottom at 50 and 100 fathoms, and 7 miles off a cast of 115, then 49 fathoms at 12 miles' distance, decreasing gradually towards the shore.

Dewghur Harbour.

DEWGHUR HARBOUR, in lat. 16° 23′ N., bears about S.E. from Geriah Point, distant 4 leagues; the coast between them is bold, having 8 and 9 fathoms within less than a mile of the shore. This harbour has 3 and 4 fathoms water in it, where a ship might lie sheltered during the S.W. monsoon, and is formed close under the N.E. point of the island on which the fort is situated; this island is on the south side the entrance of the river, and appears as part of the main, being nearly joined to it. As rocks project a considerable distance from the north point of the entrance, a ship running in for shelter, or otherwise, should after getting into 7 fathoms borrow near the Fort Point, and anchor under it in 4 or 3½ fathoms. The river is broad at the entrance, and is said to extend a great way inland.

Atchera River.

ATCHERA RIVER, in lat. 16° 11′ N., bears S. S. E. from Dewghur about 4 leagues; it is navigable by small vessels, there being 7 and 8 feet water on the bar. On the south side there is a white pagoda, and the land there is lower than on the north side of the entrance, by which this place may be known. The coast here is safe to approach within a mile of the shore, or to 5 fathoms, as far as the northernmost limit of the Melundy Rocks.

Melundy Island, and the opposite coast.

MELUNDY ISLAND, in lat. 16° 3′ N., about 3 leagues S. ½ E. from Atchera River, is fortified, but being low, not easily distinguished from the offing. About 3 miles to the northward of it there is a small islet about a mile from the shore, but connected with it by rocks, and to the southward, straggling rocks extend a great way,

joining Newtee Point. Besides Melundy Island, or Malwan, there is a fort on the main-land near it, which used formerly to protect the cruel horde of pirates, who, issuing from this place, were the dread of defenceless trading vessels. They had several large gallivats, with one sail on each. In passing this place, a large ship should not come under 12 or 13 fathoms, for 10 and 11 fathoms is close to the edge of foul ground.

NEWTEE POINT (the Fort), in lat. 15° 56′ N., about 8 miles S.S.E. from Melundy, is directly opposite to the Vingorla Rocks; between the Point and Melundy, the coast is rocky and unsafe, and the channel inside Vingorla Rocks should not be used except by small vessels, the position of the rocks bounding it not being sufficiently known.* The depths of water in this channel are from 6 to 8 fathoms, and it is 1½ and 2 miles broad. Newtee Point. Channel inside.

VINGORLA ROCKS, or Burnt Islands, extend from lat. 15° 51′ N., about 5 miles to the northward, and are distant from Newtee Point from 2 to 5 miles; some of them are 15 or 20 feet above water, having a white appearance when the sun shines on them, others are even with the water's edge. There are upwards of 20 of these rocks visible when near them, and those of the southernmost group seem connected by a reef. By bringing the outermost rock to bear W.N.W. or W. by N., a ship may anchor in 12 or 13 fathoms soft mud, and be well sheltered during a north-wester. Vingorla Rocks.

A ship passing here in the night should not come under 16 or 17 fathoms, for these rocks are steep to, on the south and west sides, having 15 fathoms very close to them. To pass them in the night.

RAREE POINT (the Fort), in lat. 15° 44′ N., bears about S.S.E. ½ E. from Newtee, distant 5 leagues; the coast between them is safe to approach, having a sandy beach and irregular soundings within a mile of the shore: and about midway is the small river Vingorla. Raree Fort, being situated on an eminence near the Point, is conspicuous from seaward; several rocks project from the Point to the westward, two of them above water lie to the S. Westward of it more than a mile distant, having 7 fathoms close to them, and 5 or 6 fathoms inside. On the north side of the Point there is a small river, navigable by boats of considerable size. In the night, ships should come no nearer to this place than 10 fathoms. Raree, and the coast near it.

CHIRACOLE FORT, in lat. 15° 41½′ N., and about 4 miles to the S.E. of Raree Point, stands on the brow of the hill on the north side of a small inlet, but is not very conspicuous. Chiracole Fort.

CHAPRA FORT, in lat. 15° 36′ N., and 2 leagues farther to the S.S. Eastward, is more readily discerned from the offing, being situated on a high bluff point at the south side of a small river, with hilly land adjacent to the sea. These two forts belong to the Portuguese, who seldom show their colours to ships passing. Chapra Fort.

From Raree Point, to the bluff point of Alguada, the coast extends about S.S.E. 5 leagues, having 6 and 7 fathoms water about 2 miles off shore. The soundings between Geriah and Goa Bay are 15 and 16 fathoms about 2 leagues off, 30 and 32 fathoms from 6 to 7 leagues off, and the edge of the bank of soundings is in general from 14 to 18 leagues off shore.

* The ship Margaret, working through this channel, struck on a rock, which made it necessary to put her under a complete repair on her arrival at Bombay.

Alguada Point and Goa Bay.

ALGUADA POINT, in lat. 15° 29′ N., lon. 73° 50′ E., forming the northern extremity of Goa Bay, is a level headland of moderate height, with an old lighthouse on it and a small fort; but the principal fort is situated close to the sea, on the S.E. side of the headland, where is a well of excellent water, from which the shipping are supplied. The common anchorage is abreast the fort, with the flagstaff bearing from N.N.E. to N.N.W., a quarter to three-quarters of a mile distant, in $4\frac{1}{2}$ or $4\frac{3}{4}$ fathoms at low water, soft mud; farther in, the depths decrease, the water being shallow all over the bay. Some rocks, mostly above water, project a small distance from Alguada Point to seaward, but this is the safe side to borrow upon.

Nostra Senhora de la Cabo, a large monastery, usually very white, is situated on the summit of the bluff point of land about $2\frac{1}{2}$ miles to the S.E. of Alguada, which forms the south side of the bay. This building, having an elevated site and being surrounded by trees, is conspicuous from seaward, by which Goa Bay may be easily known. The monastery point is surrounded by rocks called the Cabo Reef, projecting nearly half a mile, with $5\frac{1}{2}$ fathoms water close to, making it necessary to keep nearest to Alguada, in passing to or from the anchorage.

Tides.

The tide rises about 5 feet perpendicular on the springs, at the Bar of Goa River, high water at $11\frac{3}{4}$ hours, on full and change of moon; in the road, the flood is hardly perceptible, there being generally an outset from the river.

The bar at the entrance of the river is about 2 miles to the eastward of Alguada Point, having 16 or 17 feet on it at high water spring tides, but the bottom about it being hard and rocky, and the channel winding and intricate, a ship ought not to enter the river without a pilot.

After the early part of May, it is considered unsafe to remain at the anchorage in the road; the Portuguese then send their large ships, that cannot go into the river, to Marmagon, where they are sheltered from the S.W. monsoon by mooring close under the N.E. side of that peninsula; although a great swell at times rolls into the anchorage.

To sail to the anchorage at Alguada.

A ship bound to the anchorage from the southward, after rounding St. George's Islands, should steer along shore, not coming under 8 or 9 fathoms until opposite the Monastery Point, and giving a berth to the reef projecting from that point, by not coming under 7 fathoms when abreast of it, nor approaching the point nearer than $\frac{3}{4}$ of a mile, if working into the anchorage of Alguada.

City of Goa.

GOA CITY, situated on the south bank of the river, about 7 miles from the entrance, is the capital of the Portuguese settlements in India, and the residence of the viceroy. It was formerly a place of great trade, but at present the inhabitants are very poor, and have little industry or inclination to trade, subsisting chiefly on fish and vegetables.

Refreshments.

Ships touching at this place get supplied with excellent water from the well at Alguada; they may also at times procure some poultry and vegetables, and in May, fine mangoes, and other fruits.

Anchorage.

A convenient berth for watering at Alguada is to bring the flagstaff and lighthouse in one bearing N.N.W. $\frac{1}{4}$ W., and anchor in $4\frac{3}{4}$ fathoms at low water, about 2 cables' lengths, or rather more, from the flagstaff.

Marmagon.

MARMAGON, or MARMAGOA PENINSULA, is a level piece of land, appearing like an island, nearly of equal height to that of Alguada and Nostra Senhora de la Cabo. It breaks off almost perpendicularly at both ends, the north

point being that called Marmagon Point, and is distant from Alguada 4 or 5 miles to the southward.

To sail into Marmagon Road, in coming from the northward, give a good berth to Cabo Reef, which fronts the monastery at half a mile distance from the cape, not bringing the Buffalo Rock, called also Camberee Isle, farther to the westward than on with the eastern extreme of the middle or largest St. George Island, or between the inner and largest island, which will lead clear of Sounchee Rocks, situated on the S.W. extreme of Cabo Reef. Directions.

Steer to the southward until Rasseen Hill is on with the north extreme of Secretaries Island, called also Ignacia Island, which is the leading mark till up with Marmagon Point: or if Rasseen Hill is not seen, steer to the eastward, keeping Chicklee Point on with the centre of Secretaries Island, the other half of the island being shut in; and after passing the north point of Marmagon, steer eastward for the road, and anchor in 4 or 3½ fathoms, with the flagstaff on the hill bearing about S.W. by W. to W.S.W. within a quarter of a mile of the fort.*

If a ship be disabled, and obliged to run for Marmagon Road in the S.W. monsoon, when thick weather prevents the marks from being seen, or if those on board are unacquainted with the place, observe, that the outer part of the peninsula of Marmagon is about 3 or 3½ miles N. by E. ½ E. from the outermost St. George Island, and that the peninsula has a 3 fathoms shoal fronting it at the distance of less than half a mile, which shoal is about the same distance N. ½ E. from the Buffalo Rock, having close to it 5½ fathoms all around. Amee Shoal, having also 3 fathoms rocks on it, bears N. by W. from the outer point of Marmagon 1 mile, and between these two shoals is formed the fair channel leading to the road, with depths in it generally from 5 to 6 fathoms soft mud. When St. George Islands are seen, steer for the N.W. point of Marmagon, taking care not to approach it nearer than a mile till it bears to the Eastward of E.N.E.; and when the point is bearing any way between E. by N. and S.E. the channel is open, and a ship may steer directly towards it, then sail along the shore in 5 or 4½ fathoms to the anchorage in Marmagon Road. Here, supplies of various kinds may be got from the Arsenal of Goa, which in the S.W. monsoon are brought round by an inland navigation, as the bar of Goa River cannot be passed with safety in this season. Marmagon Flagstaff is in lat. 15° 24½′ N., lon. 73° 51′ E. Supplies.

The outermost or west St. George Island, in lat. 15° 22′ N., bears about true S. ¼ W. from Alguada Fort, distant 8 miles, and is of considerable height, in the form of a pyramid, having the middle or largest island nearly touching it, and extending to the eastward about three-quarters of a mile: the innermost or east island, lying to the N.E. of these, is level and not so high. Between this and the other two islands there is a channel, with 4, 5, and 6 fathoms water, which is unsafe for large vessels, the bottom being mostly uneven and rocky: and to the southward of the outer island there are two rocks, one of them covered at high water, with the Sail Rock about a quarter of a mile outside of them, and nearly half a mile off the island. About a mile to the N.W. of the inner St. George Island, near Marmagon, there is another rocky islet called the Buffalo, with a 3 fathoms bank bearing north from it, which ought not to be approached nearer than 7 or 8 fathoms. But a ship passing St. George Islands in the night should not come under 16 fathoms, for 14 fathoms is close to the southernmost rocky islets mentioned above. St. George Islands.

* These directions are taken from the excellent survey of Marmagon, the adjacent shoals, and Goa River, by the late Captain David Inverarity.

Directly East from the outer large island there is a bay, with regular soundings, within half a mile of the shore, affording good shelter from N.W. winds. The country inland, about Goa, is more elevated than the headlands fronting the sea, which prevents the latter from being discerned at a great distance in the offing.

Cape Ramas and coast adjacent.

CAPE RAMAS, in lat. 15° 5′ N., lon. 73° 58′ E., bears about S.S.E. ½ E. from Marmagon Point, distant 7½ leagues; the coast between them is low and woody, with a sandy beach and some Portuguese churches, the soundings regular, and the shore safe to approach to 7 or 8 fathoms: the country is high inland. About 2 miles to the N.E. of the cape is the entrance of Salset River, having a bar with 8 or 9 feet water in the channel, inside of which, the river separates into two branches; that extending to the N. Eastward is said to join the inlet that divides Goa Island from Marmagon Point, by which this part of the coast has generally been called Salset Island, or Marmagon Salset. Cape Ramas is a high bluff headland, forming in two level points when seen either from the northward or southward; that called the False Cape is highest, and first discernible; the other, less elevated, forms the extremity of the True Cape, on which is a small fort belonging to the Portuguese, this being the southern limit of their districts. The soundings about the cape are very regular over a soft bottom, and it is steep to, having within a quarter of a mile of the extreme point 9 fathoms mud: it projects considerably, by which a bay is formed on each side; that on the south side affords shelter from northerly winds.

Between Cape Ramas and Carwar Bay the coast is undulating, forming several small bays unfit for shipping; the soundings are regular to 6 or 7 fathoms, from 1½ to 2 miles off shore.

## COAST OF CANARA.

This coast extends from Cape Ramas nearly to Mount Dilly, and is at present subject to Britain.

Carwar Head.

The outermost Oyster Rock bears from Cape Ramas S.S.E. ½ E., distant 6 leagues, and is about 2 miles to the W.N.W. of Carwar Head. This headland, in lat. 14° 47′ N., is high, and conspicuous in coming from the southward; it projects considerably, by which Carwar Bay is formed to the northward.

Carwar Bay.

CARWAR BAY extends from Carwar Head about 2 leagues to the northward, and is about 2 miles deep, having regular soundings in it from 6 to 4 fathoms. At the bottom of the bay there is a river, with the Fort of Carwar, or Sudasaghur, on the north side the entrance; near which, within all the Oyster Rocks, are 4 and 5 fathoms. Between the outer rocks and Carwar Head, and betwixt them and the inner rocks, the depths are from 5 to 7 fathoms. At the south part of the bay there is good shelter, and the bottom in general is soft mud. Batt, or Bell Cove, at the S.E. side of the bay, is a small, but safe haven, where Indiamen used formerly to careen. Batt Cove was formerly considered a safe place to run into, if a ship happened to lose her anchors, the bottom being soft mud. The two outermost Oyster Rocks are high and rocky islets, having 10 and 11 fathoms water close to them, and are in one with the Fort, bearing E.N.E. ¼ E. About 2 leagues outside these rocks, the depths are 16 and 17 fathoms; from 20 to 22 fathoms 4 leagues off, and 25 to 27 fathoms 5 or 6 leagues off. Between Cape Ramas and Carwar Head, the depths are 14 and 15 fathoms about 2 leagues off shore. About 3 or 4 miles N.W. off the largest Oyster Rock lies a sunken rock, upon which the sea breaks in the westerly monsoon. In March, 1700, the Rooke moored in

(Margin notes: Batt Cove. — Oyster Rocks.)

5 fathoms at the south side of Carwar Bay, had a small sandy bay bearing S. by W., Carwar River N. E. ¼ E. Variation 7° 50′ W. Captain Symonds, of the Rooke, describes the best passage into Carwar bay thus: to leave to the northward two of the Oyster Rocks which lie off the mouth of Carwar River, passing between these, and the *large* rock, which must be left to the south, together with a rock even with the water's edge that lies close to the north end of the latter, which must have a proper berth, by borrowing towards the two rocks on the north side the passage.

ANJE-DIVA,* or ANJADEEPA, in lat. 14° 45′ N., distant about 2 miles from the shore to the southward of Carwar Head, is about a mile in length, and possessed by the Portuguese; it appears on the outside barren and rocky, but of a pleasant aspect on the opposite side next the main, where it is fortified by a wall and some towers. In case of necessity, a ship may find shelter under this island from the S.W. monsoon, there being 6 and 7 fathoms in the channel between it and the main land, and no danger but what is visible. Close to it on the outside, the depths are 10 and 11 fathoms, and 14 fathoms about 4 miles' distance. Anje-Diva Island.

To the eastward of it, near the shore, are two small islets, and another about 4 miles to the S.E., distant nearly 2 miles from the shore.

MERJEE RIVER, in lat. 14° 30′ N., bears about S.E. ½ E. from Anje-Diva, distant 18 miles; the land between them is high, appearing like islands, and the coast safe to approach to 8 or 9 fathoms. The entrance of the river is between two bluff points: that on the south side has the deepest water, close to which is the proper channel over the bar, where are 2¾ and 3 fathoms water between the point and sand banks in the middle of the entrance, on which the sea generally breaks. A vessel proceeding into the river, having passed the sand banks at the entrance, must cross over to the north shore, but the channel is too narrow except for small vessels. Merjee River.

A convenient situation to anchor in the road is abreast the point on the north side of the entrance, with it bearing N.E., distant 1 mile, and Fortified Island at Onore, on with the southern extreme of the land, S. by E. ½ E., in 5 or 6 fathoms water. Here good water may be procured with facility after the rains, from a pool near the fine sandy cove, a little inside the north point of the bay, but in the fair season it is nearly dry. Firewood may also be cut, and rice purchased on moderate terms. Anchorage. Supplies.

PIGEON ISLAND, in lat. 14° 2′ N., about lon. 74° 24′† E. by chronometer from Bombay, bears from Anje-Diva Island about S.S.E., distant 14½ leagues, and nearly South from the entrance of Merjee River, distant about 9 leagues. It is small, but high, situated about 4 leagues from the continent, and may be discerned 8 leagues in clear weather; two small islets or rocks lie very near it, one to the eastward, the other to the S. Eastward. There are 20 and 21 fathoms water within a mile of the island bearing E.N.E.; ships passing outside of it in the night ought therefore not to come under 23 or 24 fathoms, which will be within 2 or 3 miles of it; about 3 or 4 leagues from it, the depths are from 30 to 32 fathoms. Pigeon Island.

HOG ISLAND is high, of pyramidal form, and situated very near the main, directly East from Pigeon Island, distant 9½ miles. The channel between these Hog Island.

* Diva, *i. e.* Island.

† Captain Ross, Marine Surveyor to the Company, made it in lat. 14° 1′ N., lon. 74° 21′ 15″ E., in 1824.

islands is safe, with 15 and 16 fathoms water near Pigeon Island, and 10 or 11 fathoms towards Hog Island and the main land.

Onore, and Fortified Island.

ONORE, a place of considerable trade in pepper, rice, &c., is situated near the entrance of a salt-water river, between Merjee and Hog Island, and about 4 or 5 leagues N. Eastward from Pigeon Island. The entrance of the river may be easily known by a level island, with fortifications on it, generally called Fortified Island, which is in lat. 14° 19′ N. near the shore, about 1½ miles to the northward of the river.

Anchorage.

A ship may anchor in the road with the flagstaff of Onore bearing E. by N. or E.N.E., Fortified Island N. ½ W. or N. by W., and Pigeon Island about S. by W., distant from the shore 1½ miles, in 5 to 6 fathoms, soft ground. Fresh water is here very scarce.

The coast from hence to Barsalore.

Between Onore and Hog Island the coast is high, and may be approached with safety to 8 fathoms water; but to the southward of that island, between it and Barsalore Peak, the coast ought not to be borrowed on under 9½ or 10 fathoms in the night, nor under 8½ or 8 fathoms in the day, for several straggling rocks, under and above water, lie at a considerable distance from the shore, having 8½ and 9 fathoms within half a mile of them. Between Hog Island and the main there is a low rugged island, and several rocky islets lie near the shore to the southward.

From Hog Island to Barsalore Point, the coast extending about S.S.E. ½ E. 6 or 7 leagues forms some small bays; near the sea the land is generally low and woody, but very high in the country.

Barsalore Peak, and Bednore Mountains.

BARSALORE PEAK, in lat. 13° 50′ N., lon. 74° 54′ E., is a round mountain about 3¼ leagues inland, having the high chain of Bednore Mountains for its base; about 6 miles farther to the southward there is another mountain, in lat. 13° 45′ N., which is also frequently set by navigators as Barsalore Peak. In clear weather, this part of the coast is discernible at a great distance.

Cundapore River, and rocky coast adjacent.

CUNDAPORE RIVER, in lat. 13° 39′ N., lies to the southward of Barsalore Point, in a bay to the S.W. of the peak, near the entrance of which, several rocks project 1½ miles from the shore, having 6 fathoms water close to them, and 8 and 8½ fathoms about a mile distant, hard ground. This river is only navigable by boats and small vessels; and the shore here should not be approached under 8½ or 9 fathoms in a large ship.

St. Mary Isles.

THE ST. MARY ISLES extend from lat. 13° 28′ to 13° 17′ N.; the outermost of the range being 5 miles distant from the shore, with a channel with 3, 4, and 5 fathoms irregular soundings between them and the main, but safe only for boats. Durrea, or Deriah Bahauder Ghur, in lat. 13° 20′ N., lon. 74° 44′ E., about 6½ leagues southward from Cundapore River, is the largest of the range. Some of them may be seen 3 or 3½ leagues from the deck; the others are low, nearly even with the water's edge. They are in one with Barsalore Peak bearing N. by E. ½ E., and some of them are long, flat islets, particularly the southernmost.

Molky or Premeira Rocks.

MOLKY, or PREMEIRA ROCKS, in lat. 13° 11′ N., and 6 and 7 miles from the shore, are a small group, visible 3 or 3½ leagues from the deck, having 12 fathoms water close to them. The channel between them and the main is thought to be safe for small vessels, but is seldom used.

These rocks and St. Mary Isles ought not to be approached under 15 or 16 fathoms in a dark night, for in some places near them the depths decrease suddenly under 14 or 15 fathoms, over a hard bottom; but in day-light they may be approached much nearer, when the dangers are visible.

MOLKY RIVER, about $3\frac{1}{2}$ leagues E. S. Eastward from the rocks of the same name, is a place of shelter for boats and small vessels, and may be known by a white fort or tower near it to the northward, and two small mounts a little inland, the one sloping and the other pyramidal, one in lat. 13° 19′ N., the pyramid in 13° 12′ N. The Fort is in lat. 13° 5′ N., lon. 74° 51′ E. by the trigonometrical survey. From the Molky Rocks, Mangalore is distant 8 or $8\frac{1}{2}$ leagues, about S.S.E. $\frac{1}{2}$ E., and the coast between them is safe to approach to 8 fathoms. The chain of Bednore Mountains in this part is rendered remarkable, by a deep gap, formed by a large abrupt mountain, rising nearly perpendicularly from it on the north side; it is in lat. 13° 9′ N., and has by some navigators been called MOUNT HYDER. To the southward, the country becomes less elevated, and the hills over Mangalore are separated from each other by valleys. Molky River. The coast and mountains.

MANGALORE, in lat. 12° 51′ N., lon. 74° 53′ E., by the trigonometrical survey, is situated near the mouth of a considerable river, navigable only by small vessels, there being but 10 or 11 feet on the bar. Rice is plentiful here, sandal-wood may also be procured at times. The anchorage is soft mud, in 5, 6, or 7 fathoms, at discretion abreast the fort and river, with the flagstaff about E. by N., distance from the town 2 or $2\frac{1}{2}$ miles. About 6 leagues to the N.E. of Mangalore, and 4 or 5 leagues from the sea, in lat. 13° 2′ N., a rugged double-peaked hill, called the Asses' Ears, rises almost vertically from the low country. Mangalore.

From Mangalore, the direction of the coast is S.S.E. $\frac{1}{2}$ E. about 17 leagues to Mount Dilly; the land near the sea is generally low and woody, particularly to the southward of Barn Hill, which is a sloping mount, nearly level on the summit, situated a little inland, in about lat. 12° 40′ N., and 4 or 5 leagues distant from Mangalore. About 6 or $6\frac{1}{2}$ leagues to the southward of this hill, and nearly equal distance from Mount Dilly, stands another mount in lat. 12° 22′ N., some distance inland, called Mount Formosa, and there are other hills farther from the sea. In passing along this part of this coast, there is no danger, the depths decreasing regularly towards the shore to 7 or 8 fathoms about 2 miles off. A ship in working may stand in to 7 or 8 fathoms soft ground, when the weather is fine. About 4 miles to the northward of Mount Dilly is the entrance of Cavoy River, which takes a northerly course parallel to the coast, and very near the sea, forming several islands. The depths are $1\frac{1}{2}$ and 2 fathoms in the entrance, and a little way up are the fort and village.* The coast to Mount Dilly.

The edge of the bank of soundings, abreast of Pigeon Island and Barsalore Peak, projects 18 or 20 leagues from the coast, but converges more towards it, as the distance is increased to the southward; for abreast of Mangalore and Mount Dilly, the edge of sounding from 100 to 150 fathoms, is about 15 leagues from the shore. Between Pigeon Island and Mount Dilly, the depths are generally 30 to 34 fathoms from 8 to 10 leagues off: 20 or 22 fathoms 5 leagues off, and 15 or 16 fathoms about 2 leagues off shore; but near the latter place the coast becomes more steep, there being 20 and 22 fathoms about $2\frac{1}{2}$ or 3 leagues from the land. Soundings.

* Cattle may be got here at a moderate price. In ancient charts it is called Ram-Dilly, but by the natives Cavoy.

## COAST OF MALABAR.

Malabar Coast. THIS coast is said to commence at Declah, about 8 leagues to the southward of Mangalore, where there is a white wall in ruins, still visible from the offing; and from hence it extends to Cape Comorin.

Mount Dilly. MOUNT DILLY, or DELLI, may however be considered the limit between the coasts of Canara and Malabar, which is a conspicuous headland, that may be seen 8 or 9 leagues from the deck, in clear weather. The contiguous coast, being low and woody, is not seen far, which gives the mount the appearance of a high island, when viewed either from the northward or southward.

The outer extreme of this headland terminates in a bluff point, having on it a small ancient fort of black aspect, situated in lat. 12° 2′ N., lon. 75° 16′ E., by the trigonometrical survey. The shore here is bold and safe to approach, there being 7 and 8 fathoms at 1 and 2 miles' distance, 20 and 22 fathoms at 2 or 2½ leagues' distance; and at 15 leagues' distance abreast the mount you lose soundings. This is the narrowest part of the channel between the main and Laccadiva Islands, the distance being 27 leagues betwixt Elicalpeni Bank and Mount Dilly. Abreast of this headland there is frequently a drain of current to the southward, and a short confused swell, the effect of brisk north-westers, which greatly prevail here.

Balliapatam River. BALLIAPATAM RIVER is about 6 miles to the eastward of Mount Dilly; the coast between them, forming a bight, is low, covered with trees, safe to approach to 5 or 6 fathoms, in regular soundings soft ground. This river extends a considerable way inland, and is a place of some trade, although navigable only by boats or small vessels, there being from 1 to 2 fathoms water at the entrance, abreast of which ships may anchor in 3½, 4, or 5 fathoms, from 1 to 2 miles off shore.

Cananore. CANANORE POINT (the Fort), in lat. 11° 52½′ N., lon. 75° 26′ E.,* about 2½ leagues S. Eastward from Balliapatam, has a small bay under it on the south side, where boats are sheltered from N.W. winds. The point is bluff, and easily known by the fort and other buildings, and by the land near it having a reddish appearance. Ships may anchor abreast the fort in 5½ or 5 fathoms; 4½ fathoms is very close to the point, and near a reef of rocks under water, which requires great caution, as the ships Zoroaster and Jehangire, both belonging to Bombay, were wrecked upon this hidden danger, by borrowing too close to the shore. (Reef.)

Tellicherry. TELLICHERRY (the flagstaff), in lat. 11° 45′ N., lon. 75° 33′ E., by the trigonometrical survey, bears S. E. ½ E. from the fort on Mount Dilly 23 or 24 miles, and 3½ leagues to the S. E. of Cananore Point; the coast between them is safe to approach to 5 fathoms, but a large ship ought not to come under 6 fathoms in the night, for it is rocky under 4 fathoms from Tellicherry to Green Island. This is a small island covered with trees, situated close to Durmapatam Point, about 3 miles to the northward of the anchorage, where two small rivers fall into the sea, having 4 or 5 feet water at the entrance.

Anchorage. The anchorage in the road is soft mud, in 5¼ or 5½ fathoms, with the flagstaff bear-

* By the trigonometrical survey.

ing N. E. by N., and Green Island N. N.W., off the town 1½ or 2 miles. Within the ledge of Black Rocks fronting the fort, small vessels have been known to lie during the S.W. monsoon. Large ships touching here, or at other places on the coast, where there is a chance of unsettled weather, should anchor well out in 7 or 8 fathoms; for H. M. S. Superb, of 74 guns, was lost at Tellicherry, in November, 1781. The fleet having anchored in 5 and 5½ fathoms, a heavy sea began to roll in, which made that ship strike on the Sultan's anchor, she being moored inside of the Superb. Good water and other refreshments may be procured here, and also at the ports mentioned above.

The land about Tellicherry and Cananore appears rather low and barren near the sea, but at a distance in the country, over the former place, the Ghauts are formed of high undulating mountains. Aspect of the land.

From Mount Dilly to Tellicherry, the soundings are regular, 20 or 22 fathoms about 4 leagues off, and from 30 to 34 fathoms 7 or 8 leagues off shore.

MAHE FORT, in lat. 11° 41′ N., is near the mouth of a small river, about 4 or 5 miles to the S. Eastward of Tellicherry; the land between them is rather low near the sea, with some hills, on one of which Moilan Fort is situated. Mahe.

Ships anchor at Mahe in 5 or 6 fathoms soft ground, abreast the flagstaff bearing E. by N., or E.N.E. 1½ or 2 miles off shore.

SACRIFICE ROCK, called Cugnali Island by the natives, in lat 11° 30′ N., lon. 75° 35½′ E., bears about S. ½ E. from Tellicherry nearly 5 leagues, and distant 2 leagues, from the land opposite; it has a white aspect, discernible 3 and 3½ leagues from the deck of a large ship, being elevated 15 or 20 feet above water. This rock or island is steep all round, having 12 and 13 fathoms close to it, 16 fathoms about 1½ or 2 miles outside; 10 fathoms within it, to 7 fathoms about mid-way between it and the main, in a very good channel. Sacrifice Rock. Channel between it and the main.

COTTA POINT, situated to the eastward of Sacrifice Rock, at the entrance of Cotta River, is low and covered with trees, having a flat or reef* of shoal water extending from it along shore to the northward; ships passing through the inside channel ought, therefore, to give the point a good berth, by borrowing towards the rock; and in working should heave the lead quick, if they come under 6 fathoms standing in shore. Cotta Point and Reef.

Passing outside Sacrifice Rock in the night, do not come under 16 or 17 fathoms water.

CALICUT, in lat. 11° 15′ N., lon. 75° 50′ E., by the trigonometrical survey, bears from Sacrifice Rock S.E., distant 6½ leagues, and may be known by several hills near the sea; one of them, a little to the southward, resembles two paps. To the northward of the town, some tombs or small pyramids may be discerned. Calicut and adjacent land.

The mountains of the Ghauts approach nearer the sea, and seem higher here than on any other part of the coast; directly inland from the town, about E.N.E., there is a knob or hummock on the summit of the mountain, called by some navigators the Camel's Hump, and another farther to the northward, somewhat similar. Ghaut Mountains.

* The Prudence and Union, ordnance store ships, were driven from Calicut Road in a storm, at the setting in of the S.W. monsoon, and not being able to weather Cotta Point, were both wrecked on the reefs near it, on the 20th May, 1782. About 14 years afterwards, the Hercules, of Bombay, by borrowing too close in the night, grounded, and was nearly lost.

Anchorage. The anchorage for a large ship is in 5 or 6 fathoms, with the flagstaff E. by N. $\frac{1}{2}$ N., or the tombs from E.N.E. to E.N.E. $\frac{1}{2}$ N., off shore from 2 to 3 miles. Small vessels may lie inside the rocky bank abreast the town, which has 3 fathoms on it, and 5 fathoms a little outside; large ships ought, therefore, not to anchor under this depth, except first examining the bank.

A considerable trade is carried on in pepper, cardamoms, timber, &c.; the country about this place and Mahe abounds in pepper.

Coast between Tellicherry and Calicut. The coast between Tellicherry and Calicut is mostly low, interspersed with hills at a small distance from the sea; inland, the Ghaut mountains are very high, ending in undulating declivities over the former place. The depths on this part of the coast are 20 and 22 fathoms 4 or 5 leagues off, and 30 to 32 fathoms about 8 leagues off shore. In passing round Cotta Point, and from thence nearly to Calicut, a large ship should not come under 6 fathoms.

Beypore River. BEYPORE RIVER, in lat. 11° 10′ N., lon. 71° 52′ E., bearing S. by E. from Calicut about 2 leagues distant, has 8 or 10 feet water on the bar at high tides, but the rise and fall is very little along the Malabar coast. This river takes its rise from the Ghauts, and runs through a country abounding with excellent teak timber for ship building. A little inland from this place, there is a hill called the Dolphin's Head.

Tanore River. About $3\frac{1}{2}$ leagues farther to the southward, in lat. 10° 59′ N., is situated the small river of Tanore, and 3 or $3\frac{1}{2}$ leagues distant from it to the S.S.E. there is said to be another river, navigable only by boats or small vessels, where, in lat. 10° 51′ N., is situated the village Colay. Tanore may be known by a tuft of trees; the coast is very woody between it and Paniani.

Paniani Tree. PANIANI RIVER (the tree near it) is in lat. 10° $46\frac{3}{4}$′ N., lon. 76° 0′ E., and about 5 leagues S.S.E. from Tanore; the river is navigable only by small craft, the water being shoal; off this place there is a shoal, with 4 fathoms on it, distant 3 or 4 miles from the shore, having 6 fathoms inside, and $9\frac{1}{2}$ or 10 fathoms about a mile outside. Large ships may avoid it by passing in 10 fathoms, but the rest of the coast from Calicut to this place, and from hence to Cochin, may be approached to 6 or 7 fathoms. The whole of this space is low and woody fronting the sea, but inland, the high ridge of mountains, called the Ghauts, extends nearly parallel to the coast to Cape Comorin; excepting a remarkable interruption or gap of low land between Paniani and Cochin, through which the land winds usually blow stronger than any other part of the coast.

Chitwa. CHITWA (the church), in lat. 10° 33′ N., is situated on the north side the River Chitwa, or Palur, about 2 or $2\frac{1}{2}$ leagues S.S.E. of Paniani River. Ships anchor off this place in 6 fathoms mud abreast the river, which is wide, but the water being shallow, it will admit only boats or small vessels.

Cranganore. CRANGANORE FORT, on the river of this name, called also AYCOTTA RIVER, is in lat. 10° 12′ N., lon. 76° 17′ E., bearing S.S.E., and S.S.E. $\frac{1}{2}$ E., 11 leagues from Paniani Tree. The river has a bar at the entrance, with 5 and 6 feet water on it, and 14 or 16 feet inside. From the south point, a mud bank, with 3 fathoms on it, projects out near 2 miles to seaward. Coir, timber, and some pepper, are exported from these rivers situated between Calicut and Cochin.

Coast to Cochin. From Cranganore, the coast stretches about S. by E. and S. by E. $\frac{1}{2}$ E., $5\frac{1}{2}$ or 6 leagues to Cochin; the general direction of it from Calicut to the latter place is S.S.E.,

but varies at different parts between S. by E. and S.E. by S. The depths are 20 and 22 fathoms from 5 to 6 leagues off shore, the low land then just visible from the deck; and 30 or 32 fathoms is about 8 leagues from it. From lat. 10° 30′ N. to the parallel of Cochin, the edge of the bank has a steep declivity, from 36 or 40 fathoms to 100 fathoms, no ground, about 9 or 9½ leagues off shore. Soundings.

COCHIN (the Flagstaff) is in lat. 9° 58′ N., lon. 76° 18½′ E., by the trigonometrical survey, and the town, which is situated on the south side the entrance of the most considerable river on this coast, is a place of consequence as a naval depôt, the country abounding with excellent teak timber for ship building, and coir for cordage. Several ships have been built here, for the merchants of Bombay, measuring from 600 to 1,000 tons. The bar is navigable by ships drawing 14 or 15 feet water; the channel over it is close to the northern shore, and to the breakers, by steering direct for the Portuguese church, situated on the north side the river. The ebb upon the bar is very strong, and runs much longer than the flood; vessels, therefore, do not attempt to run in, unless the wind is from the sea. On the springs, the rise of tide is seldom more than 6 feet. Cochin. Tides.

There is, at times, a surf on the bar, occasioned by the strong ebbs running over the shoal parts against the sea breezes; strangers ought, therefore, in running for the river in their boats, to be careful to keep in the proper channel between the reefs on each side, which project out about a mile, as several accidents have happened, by persons unacquainted crossing the bar late in the evening. The river inside is deep, and may be considered as an arm of the sea, for it extends to the southward parallel to the line of coast, and very little distant from it, communicating with Iviker Inlet or River, which falls into the sea to the northward of Quilon, forming islands by the various inlets.

Although the town has a white appearance, it is not easily discerned from the offing, being almost hid by trees when approached from the southward, but the flagstaff is high above them, and easily perceived with a telescope.

The common anchorage is in 5½, 6, or 6½ fathoms soft ground, with the flagstaff E. ½ N. to E.N.E. off shore 2 or 3 miles. Water, poultry, and other refreshments, may be procured here. Anchorage.

ALIPPEE, in lat. 9° 30′ N., lon. 76° 24′ E., bearing S. by E. from Cochin, distant 9 leagues, may be known from the offing, in coming from the northward, by a large white house, which is hid by some coco-nut trees, when approached from the southward. Alippee.

This village is situated in the kingdom of Travancore, and carries on a considerable trade in teak timber, betel-nut, coir, and pepper. A large ship may anchor in 5 or 5¼ fathoms with the large White House N.E. by E.; or a ship not drawing more than 18 feet water may anchor in 4, or ¼ less 4 fathoms, with the Flagstaff bearing N.E. distant about 3½ or 4 miles. The land has encroached considerably upon the sea here during these last 20 years, and being fronted by a soft mud bank, a vessel might ride with less risk than at any other part of the coast.

Between Cochin and this place,* the coast is very low, covered with trees, and may be approached to 5 or 6 fathoms in a large ship, the bank being very even to 5 fathoms, about 1 or 1½ miles from the shore.

* The Earl Camden in 5¾ fathoms, with a village bearing E. N. E. ½ E. when at anchor, made it in lat. 9° 42′ N. by observation, which must lie considerably to the north of Alippee, if this observation was correct.

Reported Rock.

Captain Butler, of the ship Futtay Rahimon, is reported to have seen a rock off this part of the coast, in lat. 9° 19′ N., lon. 76° 21′ E., and that he had soundings of 35 fathoms a quarter of a mile outside of it.*

Porca.

PORCA, in lat. 9° 20′ N., bearing about S. by E. ½ E., or S.S.E. 3½ leagues from Alippee, is another village belonging to the Rajah of Travancore, of considerable extent, but the houses are not easily seen except when near the shore. Coir, plank or timber for ship building, and pepper, are exported from these places, and from some of the adjacent ports. The coast continues low and uneven, safe to approach to 5 or 6 fathoms. The anchorage is opposite the village, in 5½ or 6 fathoms, 1½ or 2 miles distant.

Crahul.

Between Alippee and Porca, a village named Crahul is situated, with cajan storehouses close to the water's edge; it carries on some trade.

Carunapale.

CARUNAPALE, lies to the northward of Iviker River, and when running along the coast in 8 fathoms, it may be easily distinguished by a considerable opening like the mouth of a river.

Iviker.

IVIKER, or AYBICKA RIVER, in lat. 8° 54′ N., is a little to the N.W. of Quilon, and has on its banks a village of the same name, subject to the Rajah of Travancore. The River has a wide entrance, communicating with several other rivers, one of which extends parallel to the coast, and unites with Cochin River, forming a safe inland navigation. This place admits only boats over the bar at the entrance, there being but 5 or 6 feet on it at high water, and the bottom consists of hard sand and gravel, as far out as 8 fathoms. A large ship touching here to take in plank, or other articles, may anchor in 7 fathoms, with Quilon Point bearing S.E. by E., and the middle of Iviker River's mouth N.E. by E.; or in 6 fathoms hard sand, with the river's mouth N.E. ½ E., and Quilon Flagstaff S.E. by E. ½ E., off shore about 3 miles. It would not be prudent to go farther in with a large ship; the soundings are very irregular under 8 fathoms, particularly to the northward of this anchorage.

Quilon, and Reef.

QUILON, or QUILOAN POINT (the fort), in lat. 8° 53′ N., lon. 76° 38½′ E., or 55 miles west from Cape Comorin by chronometer, bears S.S.E. about 10 leagues from Porca; the coast between them is low, covered with trees, and may be approached to 5½ or 6 fathoms, till near the entrance of Iviker River. Quilon bank, of hard ground, extends from Iviker round Quilon Point, where it becomes very uneven, and dangerous to approach under 12 or 13 fathoms; for under these depths, abreast the Point, there are sudden overfalls from 9, to 4, 3, and 2½ fathoms rocky bottom.

The reef or foul ground of Quilon should not be approached under 12 fathoms, for the ships Concord and Britannia, of Bombay, grounded in the night, by borrowing too close. The rocks penetrated through the bottom of the latter ship, but she was saved by the chunam or plaster work amongst her floors, which floated her to Bombay.

Quilon is a projecting part of the coast, and the point a little higher than the other land; when far out in the offing in 29 or 30 fathoms, it may be known by a *bushy tree* or *tuft*, more elevated than the others. To the southward of the reef and point, the coast forms a bight, where ships may anchor about 2½ or 3 miles from the fort, and be sheltered from N.W. winds by the reef.

* See Nautical Magazine for 1835, p. 392.

Anjenga.

ANJENGA (the fort), in lat. 8° 39½′ N., lon. 76° 49½′ E., bears from Quilon S.E., distant 6 leagues; when 3 miles to the southward of the latter, the coast may be approached to 9 or 10 fathoms, which will be 1½ or 2 miles from the shore. There are some reddish cliffs about 4 miles to the northward of Anjenga, which may denote the approach to it, in coming from that direction; for the fort and houses being low, and the coast also low and woody, this place is not easily distinguished from a considerable distance in the offing. In clear weather it may be known by a remarkable peak of the Ghauts, sometimes called Anjenga Peak, about 8 leagues inland, higher than the adjoining mountains, which is in one with the fort bearing E. 4½° S. This Peak may be seen from abreast of Quilon, and until to the southward of Cape Comorin.

Anchorage.

Under 10 fathoms in Anjenga Road the bottom is sand, and in some parts rocky to the southward of the fort; ships ought, therefore, not to anchor under 10 or 11 fathoms, the ground being good in these depths. A convenient berth is with the Flagstaff N.E. by E. ½ E., Brinjall Hill, S.E. by E. ¼ E., and the extremes of the land from N.N.W. ¾ W., to S.E. ¼ S., in 11 or 12 fathoms mud, off shore 1½ or 2 miles. Coir may be procured here, but the water is indifferent and scarce, and few articles of refreshment are to be obtained: ships load pepper here, and at Quilon, also at Calicut, Tellicherry, and Mahé, which is brought in tonies or country boats, adapted for passing through the surf. There is said to be fresh water at the Red Cliffs to the northward of Anjenga, but it cannot be got conveniently; a considerable surf generally prevailing on the coast, particularly to the southward, renders it frequently unsafe for ships' boats to land.

Soundings.

The depths of water between Cochin and Anjenga, are 20 and 22 fathoms from 2 to 3 leagues off, 30 to 34 fathoms about 5 and 5½ leagues off; and the edge of the bank of soundings is distant 9 or 10 leagues from the shore.

Ruttera Point, and adjacent coast.

RUTTERA POINT, in lat. 8° 23′ N., lon. 76° 58′ E., or 36 miles west from Cape Comorin by chronometers, bears S.S.E. ½ E. from Anjenga, distant 6 leagues; it is a piece of low level land, terminating in a bluff, fronting the sea, higher than the contiguous coast, but projects very little. About 3½ miles to the northward of the Point, there is a village, established not long ago by the Rajah of Travancore, called Pondera, having a high flagstaff with several straggling buildings between it and Anjenga. The coast in this space is low, and abounds with trees; it is bold to approach, having 12 or 13 fathoms at 1½ and 2 miles' distance, 25 or 26 fathoms about 2 and 2½ leagues' distance; and the edge of the bank of soundings is about 9 leagues distant from the shore. Inland, the Ghaut mountains are very high, and between them and the coast some small hills appear, the most remarkable of which is a regular sloping round mount, called Brinjall Hill, from its appearance in some views in about lat. 8° 28½′ N., a little to the N. Eastward of Ruttera Point. This hill being but 2 or 2½ leagues from the sea, is visible at a considerable distance from the southward, and is also seen from Anjenga Road.

General direction of the coast.

A line drawn from Kundaree Island S. 21° E., or S. 22° E., would pass through Ruttera Point; but the coast has between them several projecting headlands and convexities to seaward, particularly at Geriah, Carwar, Mount Dilly, and Quilon, whereby a considerable change is produced in the contour of the shore. It may, however, be observed, as a *general rule*, that a ship being abreast of Kundaree, at 8 leagues' distance, a course steered S. by E. will place her about the same distance from the land at Geriah, and from thence a course made good S. S. E. ¼ E., will carry her

about the same distance from Ruttera Point. Abreast of this Point, the depths are 24 and 25 fathoms at 4 or 5 miles' distance, and within $1\frac{1}{2}$ or 2 miles of it there is 12 or 14 fathoms.

Point Veniam, and the contiguous coast.

POINT VENIAM, about $2\frac{1}{2}$ leagues S.E. from Ruttera Point, is formed of steep bold land, or reddish cliffs, considerably elevated, having on the north side a small river, and a village at the northern extremity of the high land that forms the Point; the coast between Ruttera Point and it, is low and woody as far as the village, and forms a small concavity. The land close to the eastward of Point Veniam appears reddish, intermixed with white patches in some places; it is high and steep towards the sea, and extends from the point along the coast a few miles to E.S. Eastward.

From thence to Cadiapatam Point.

From Point Veniam, the coast takes a direction about S.E. by E. to Cadiapatam Point, $5\frac{1}{2}$ or 6 leagues; the land facing the sea is mostly steep and high, of red appearance in some places. About half-way between them, the Island Enciam, having a church and some other buildings on it, is situated near the shore, and rocks above and under water project from it to a small distance. To the northward of these, lie the town and river of Tengaypatnam; this river having a bar at the mouth, can only be entered by large boats in the rainy season, although navigable inside at all times, and extends a considerable way inland. There are several small villages and churches along this part of the coast, and some of these *ancient* Nestorian churches may be seen interspersed along the shore from hence to Cape Comorim. A little to the eastward of the Island of Enciam, the steep land near the sea has a red aspect, resembling that about Point Veniam, between which and Cadiapatam Point is situated the village Kolatchy or Coleche, where the coast forms a small bay, or concavity. Kolatchy church is in lat. 8° $10\frac{3}{4}$′ N., lon. 77° 18′ E., by the trigonometrical survey.

Tengaypatnam.

Kolatchy.

Cadiapatam Point.

CADIAPATAM POINT, in lat. 8° 9′ N., lon. 77° 20′ E., is steep and high, of reddish appearance, with a few trees near its extremity. To the S. Westward of this Point, there are two rocky islets about a mile from each other, and distant 2 or $2\frac{1}{2}$ miles from the Point, surrounded by rocks under water, and foul ground. About 1 or $1\frac{1}{2}$ miles S. $\frac{3}{4}$ E. from the westernmost of these islets, and $3\frac{1}{2}$ or 4 miles from the Point, lies the outermost or CROCODILE ROCK, a small part of which appears sometimes above water, but the sea does not appear to break on it at all times,* nor is it visible at high water, when the sea is smooth.

Crocodile Rock.

From this rock, the extreme low point of Cape Comorin is said to bear East or E. $\frac{1}{4}$ S., distant about 5 leagues, the outermost high land over the Cape E. by N. $\frac{1}{4}$ N., Cadiapatam Point N.N.E. $\frac{1}{2}$ E., the westernmost small islet N. $\frac{3}{4}$ W., and the northern extreme of the land N.W. $\frac{1}{2}$ N. Close to it, there are 13 and 14 fathoms, 17 fathoms about a quarter of a mile outside, 19 fathoms about a half a mile, 22 fathoms about 1 mile, and 23 fathoms about 2 miles outside of it, sandy bottom.

The Dublin, November 20th, 1791, was at sun-set in 22 fathoms, Cape Comorin bearing E. $\frac{3}{4}$ N., Cadiapatam Point N. $\frac{1}{2}$ W., the Crocodile Rock N.W. $\frac{1}{2}$ N., off the point 3 leagues, and off the Rock a little less than half a mile. This Rock, by the Dublin's journal, lies near 2 leagues from the shore, the central part just visible above water, and breaks about two ships' lengths N.E. and S.W.; it bears S.W. from a rock

* Rounding Point Cadiapatam in the Anna, at 2 or 3 leagues' distance, in soundings from 24 to 26 fathoms, when the water was very smooth, no breakers were discernible on that rock. We passed it in 23 and 24 fathoms in a clear night, at another time, but it could not be perceived.

or islet that lies about half a mile off shore; there are two of these rocks with several breakers about them, bearing about N.W. by N., and S.E. by S. $1\frac{1}{2}$ miles from each other, neither of them more than half a mile off shore.* The sea broke nowhere but on the two rocks in shore, and on the Crocodile Rock, and there seems to be a good passage between the latter and the main.

His Majesty's ship Suffolk, 10th February, 1800, at 6 A.M. had Ruttera Point on with Anjenga Peak, bearing N. 55° E. $11\frac{1}{2}$ A.M. Cape Comorin bore N. 84° E., the breakers on the Crocodile Rock N. 40° E. in one with a white house a little to the southward of a piece of red land called West Cape. The Crocodile Rock breakers, when on with the northernmost White Rock, bore N. 9° W., and these breakers seemed to be 3 miles distant from the shore.

Captain W. Richardson, 23rd February, 1809, passed within a quarter of a mile *outside* of the Crocodile Rock, in the Agnus, and observes, that when the tide is high, and the water smooth, the sea *only at times* shews a small breaker upon the rock.

Captain Edgcumbe, of the Royal Navy, describes this danger as follows, having passed *inside* all these rocks, in 1809.

There are two small rocks off Cadiapatam Point, the easternmost of which bears from that point S.W. by W., distant about 2 miles, and they lie from each other E.S.E. and W.N.W. about $1\frac{1}{2}$ miles distant, having several straggling rocks under water around, not more than a stone's throw from them. We passed in His Majesty's ship Psyche, between Cadiapatam Point and these rocks, least water 10 fathoms abreast the easternmost rocks, and when abreast of the westernmost rocks, the least water was $6\frac{1}{2}$ fathoms, having borrowed most towards the rocks in passing. Outside these rocks, lies a small *Sunken* Rock under water, which I am almost certain is that called the Crocodile Rock, described as appearing above water, which it really does not; I could only see the bare top of it from the mast-head, when the swell left it after breaking. This Sunken Rock bears from the easternmost of the above-mentioned Cadiapatam Rocks S.W. by S. distant 2 miles, and from the westernmost S. by E.

From Ruttera Point to Cadiapatam Point, the bank of soundings extends about 9 or 10 leagues from the land; 30 fathoms is from 4 to 5 leagues off; 25 or 26 fathoms is $2\frac{1}{2}$ and 3 leagues from the shore, which should not be approached under these depths about Cadiapatam Point, during the night or in dark weather, on account of the straggling rocks off that place: to the westward of these rocks, the coast is not so dangerous. In passing between them and Ruttera Point, from 22 to 26 fathoms is a good track with the land wind; or the coast may be approached to 18 and 20 fathoms occasionally; between Enciam Island and Ruttera Point, a ship may borrow into 16 or 17 fathoms. Soundings.

From Cadiapatam Point, the low sandy extremity of Cape Comorin bears E. by S., or E. by S. $\frac{1}{4}$ S., distant about 6 leagues; the coast between them having a little concavity in some places, is low and sandy close to the sea, rising in a gentle acclivity to the base of the mountains situated a few miles inland. Close to the shore some churches are seen, and about 5 miles to the westward of the cape lies the small river Manacoudy, with rocks barring its entrance, and some buildings near it: between this place and the grove of trees at the village of Cape Comorin, the low country seems divided by a wall or trench, stretching from the shore to the mountains, and fortified by mounds of earth. Coast from Cadiapatam Point to Cape Comorin.

* These rocks seem to lie farther off shore, than given by the Dublin's Journal, as the Psyche frigate passed between them and the main.

The land between the Ghauts and the shore, from Point Veniam to Cadiapatam Point, may be seen 7 leagues; and the mountains inland 18 or 20 leagues, in clear weather.

In passing along this part of the coast, when clear of the rocks off Cadiapatam Point, the shore may be approached to 22 or 20 fathoms toward Cape Comorin, which will be about 3 miles off; but in the night or in hazy weather, it ought not to be approached so close.

Cape Comorin; the adjacent coast, and Ghaut mountains.

CAPE COMORIN, the southern extremity of the Peninsula of Hindoostan, I made in lat. 8° 5′ N., lon. 77° 35′ E.* It is formed of a circular low sandy point, not discernible above 3½ or 4 leagues from the deck of a large ship. Within 2 or 3 cables' lengths of the S.E. part of the point, lies a sloping rocky islet high above water, with other rocks about it, on which the sea breaks: to the westward of this islet, the shore of the cape is sandy and barren, but to the eastward it abounds with trees, having a fort and village among them close to the sea; the former 3 miles, and the village about 6 miles to the eastward of the islet. A little westward from the islet, on the extreme sandy pitch of the cape, stands a low white square building near the water's edge, with another larger building and some small forts beyond it at a little distance: from these, a large town or village extends to the eastward, in front of a plantation of tall trees on the upper part of the low land. This piece of land seems well inhabited, and extends from the western sandy part of the cape along shore to the eastward, rising from the sea with a gentle acclivity to the base of the nearest of the Ghaut mountains, which is about 1 or 1½ miles from the shore. Close behind the plantation of trees, these mountains rise in majestic sharp peaks, chained together, and forming a ridge, which is in one with the cape bearing N.N.E.; after extending some distance in that direction, this ridge or chain inclines to the westward of North, and stretching nearly parallel to the coast, forms the interior boundary of the Province of Malabar, and joins to the chain of Bednore Mountains in the province of Canara. In sailing along the coast, the Ghaut Mountains are always seen in clear weather, excepting where there is a gap or chasm in them; the southern part of the chain being near the sea, may be discerned when 18 leagues distant from the coast; and the outermost peaked mountain, which in some views appears isolated, is generally set for Cape Comorin by ships passing at too great a distance to discern the low land of the cape. A little detached from the end of the chain over the cape, on the east side, there is a sharp conical mountain by itself, like a sugar-loaf, and 4½ leagues farther eastward, a sloping mount in the low country, a little inland.

The low land that forms Cape Comorin, seems bold and safe to approach within 1½ or 2 miles. In crossing from Caliture in the Anna, 26th and 27th March, 1801, we had a brisk gale at S.W. and W.S.W., with a leeward current, with which we made the coast of Madura 13 leagues to the eastward of the cape, at the high building or church on Manapar Point, situated in lat. 8° 22′ N. From hence, with a fresh westerly wind, we reached the cape in 30 hours, there being no current near the land.

Soundings near Cape Comorin.

The soundings were found very regular, generally mud, with sand and shells at times; the depths from 9 to 11 fathoms 3 and 4 miles from the shore, and 20 fathoms about 3½ to 4 leagues off, when far to the eastward of the cape. When it was approached, the coast became more steep, for we tacked in 13 fathoms with the extreme point of

* By the Great Trigonometrical Survey;—but it was formerly placed 10 miles farther East. Comorin Peak is 18 miles nearly North from the Cape, or in lat. 8° 23¼′ N., lon. 77° 34′ 56″ E. Lieut. Raper, in his Table of Positions, gives the cape in lat. 8° 6′ N., lon. 77° 30′ E., and the peak in lat. 8° 24′ N., lon. 77° 30′ E.

the cape bearing W. ¾ S., distant 3 miles, and off the shore abreast 1½ miles; and when the building near the sea, on the pitch of the cape, bore N. ½ E., distant 2 miles, tacked in 18½ fathoms, the depths being greater toward the shore on the S. and S.W. sides of this headland, than they are to the eastward.

From 18½ fathoms abreast the cape, at 2 miles' distance, the depth increases only to 20 fathoms in a run of 5 miles off shore; to the eastward, the bank appears flat, with very regular soundings under 16 fathoms. The shore is low and woody to 11 leagues eastward of the cape, forming a bay with the appearance of a river in lat. 8° 13′ N., and the point on the south side of this bay, is that sometimes called the East Cape. From this coast, the bank of soundings extends a great way out, the depths are 31 and 32 fathoms with the cape bearing N.N.W. 5 leagues. With the land over it bearing from N.N.W. to N.E. by E. in lat. 7° 49′ N., there are 42 and 45 fathoms, about 8 leagues off shore. The extremes N.N.E. to N.E. by E. off the cape 8 or 9 leagues, 56 fathoms; from North to N.E. by E., off it 8 leagues, 38 fathoms; and directly south from it 9 leagues, 48 to 50 fathoms. In lat. 8° 5′ N. about 9 leagues West from the cape, and 5 or 6 leagues off shore, the depths are 32 to 35 fathoms; and 15 or 16 leagues west from it, there are 63 and 65 fathoms on the edge of the bank, about 9 leagues from the nearest land.

A great way out from the cape, there is a bank abounding with cod, where some ships have caught considerable numbers of those fish, but it appears to be of small extent, and little known. In lat. 7° 28′ N. with the mountains over the cape bearing from N. by E. to N. by W. distant 12 or 13 leagues, we had soundings 46 fathoms; and in lat. 7° 47′ N. the land bearing from North to N.E. ½ E., distant 9 or 10 leagues, there are 37 and 38 fathoms; probably one of these positions may be on the cod bank. A Cod Bank.

There seems to be very little variation of the compass in the vicinity of Cape Comorin at present, or near any of the coasts which form the peninsula of Hindoostan, although Captain Basil Hall, in March, 1815, made the variation 2° 9′ E. in lat. 6½° N., lon. 79° E., a little to the westward of Ceylon. Variation.

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# DIRECTIONS TO SAIL FROM BOMBAY TO THE SOUTHWARD IN THE SOUTH-WEST MONSOON.

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Directions for working out of Bombay Harbour have already been given (see p. 467), it is therefore only necessary to premise, that ships passing along the edge of the bank of soundings in the strength of the S.W. monsoon, should be always prepared for stormy weather, because the squalls are often of long continuance and very severe; at other times, fine weather may be experienced, with intervals of light breezes. Late in June, some ships in 45 and 50 fathoms water, have been unable to make any progress to the southward for several days together, by the wind blowing in severe squalls from S. Westward with a high sea; others with indifferent sails bent, after splitting them, have been nearly driven on shore, and two fine ships were really driven on it, and wrecked several years ago. By carrying a press of sail during the squalls, many

ships have lost a lower yard or topmast; it is therefore prudent, when the weather seems to be setting in severe, for a large ship to make snug, by taking a reef in her courses.

General direction of the coast. To proceed to the southward.

From Bombay Harbour to Geriah, the direction of the coast is S. by E., the latter being a projecting part of the land; afterward, its general direction is about S.S.E. to Quilon, and from thence more easterly to Cape Comorin. The best track after getting an offing, is to keep on the edge of the bank of soundings in from 40 to 60 fathoms; more particularly in June and July, it is prudent to keep well out from the coast. It is of little consequence whether a ship get out of soundings or not, until she approach the head of the Laccadiva Islands, but after reaching lat. 12½° or 13° N., care must be taken to obtain soundings, if not certain of your position by chronometer, that you may be able to shape a course to pass inside of Elicalpeni Bank.

Elicalpeni Bank.

This bank lies in lat. 11° 16′ N., having only 6 and 7 fathoms rocks in some places, and is distant from Mount Dilly 27 leagues; a large ship would probably strike on it when the sea runs high in the S.W. monsoon, it ought therefore to be avoided. About mid-way between Mount Dilly and this rocky bank, there are soundings of 65 and 70 fathoms, but a little farther out, no ground.

As you proceed to the southward, the wind will generally become more favourable, veering to West and W.N.W., with a current setting southward at the rate of 15 or 20 miles daily, and sometimes stronger. On the southern part of the coast, between Cochin and Cape Comorin, the southerly currents and W.N.W. winds prevail greatly, part of July, August, September, and part of October. Having entered the channel between the Laccadiva Islands and the coast, continue to steer along on the edge of soundings, or should you get off the bank it is of no consequence, as the soundings do not extend so far from the coast to the southward of Callicut, as they do farther to the northward. The land may also be approached with greater safety, the squalls being less severe and the wind more favourable; but it is still advisable not to come under 30 fathoms, unless you are to touch at some place on the coast. This ought to be done with caution, for a ship intending to stop at any port on this coast in the S.W. monsoon, should anchor a great way out, prepared at all times to put to sea on the appearance of threatening weather.

If you get observations for latitude and chronometers, in proceeding from Bombay to the southward, and your distance from the land be correctly ascertained, it will seldom be requisite to sound, particularly when you have passed Elicalpeni Bank. You may then steer about S.S.E., and S. by E. ½ E., as circumstances require; keeping from 6 or 7, to 12 or 14 leagues from the coast, in the early part of the monsoon, until you are abreast of Cape Comorin; but in steady settled weather in August, it may be approached within 4 or 5 leagues at discretion.

To cross the Gulf of Manar.

When abreast of Quilon, the coast takes a direction more to the S.E., and you may from thence shape a course for the south end of Ceylon, taking care to allow for an easterly current which sometimes sets into the Gulf of Manar.* Point de Galle bears from Cape Comorin S. 53° E., distant 66 leagues; being abreast of the latter, or in soundings between it and Quilon, do not steer more easterly than S.E. at the utmost,

* The Gunjavar crossing from Cape Comorin in August, bound to China, experienced a current setting into the Gulf, and having steered mostly S.E. by E., she made the Haycock bearing E.N.E. ½ E. at day-light; falling little wind with a heavy swell, she was obliged to anchor in 34 fathoms about 3 miles off shore; shortly after, squally weather set in at S.S.W., which forced her to carry a press of sail, whereby she broke some of her chain plates, twisted the head of her mainmast, and was four days in beating round Point de Galle, sometimes under close reefed topsails.

until you get on the parallel of Point de Galle, unless your situation is known by chronometer. When bound to Malacca Strait, or other parts to the eastward, it is not necessary to pass close to the south part of Ceylon; but if bound to the Coromandel Coast, you ought to make Point de Galle, or Dondre Head, and after rounding the Great and Little Basses, steer along the east side of the island, keeping within a moderate distance of the coast to Point Palmyra; then stretch over to the N. Westward for Point Calymere, or the land about Negapatam. To sail round Ceylon to the Coast of Coromandel.

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# MONSOONS, LAND AND SEA BREEZES AND CURRENTS, ON THE WESTERN SIDE OF HINDOOSTAN, WITH GENERAL DIRECTIONS.

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THE NORTH-EAST MONSOON, or fair weather season, generally commences about the middle of November at Bombay, and on the northern parts of the coast; but sooner to the southward of Mount Dilly, about Calicut, Cochin, and Anjenga. The strong S.W. and Westerly winds fail after the middle of September, and are followed by light variable breezes, frequent calms, cloudy weather, and showers at times. This unsettled state of the winds and weather, between the monsoons, generally begins late in September, and continues 6 or 8 weeks, the prevailing breezes from N. Westward, but at times from S.W. and southward; at other times, squalls may happen, blowing from the land, although these are seldom experienced in September or October. Change of the monsoons.

At the breaking up of the S.W. monsoon there is often much thunder and lightning; it is sometimes attended with a sudden storm from southward, which veers to S.W., but more generally to S. Eastward, blowing very violent for several hours. This storm has in general happened late in October, or early in November,* after which, the N.E. monsoon sets in, with land and sea breezes, and fine weather; but the monsoon frequently breaks up without any storm.

The navigation, sailing either up or down the coast, in October and great part of November, is usually tedious and uncertain, for there is no dependence on the winds till late in November, or about the beginning of December; the sky then becomes serene, with land and sea breezes, favourable for sailing up and down the coast. Navigation in October and November.

In December and January, the land winds are regular and strong, and at times, to the southward of Calicut, then continue to blow through a large chasm in the Ghauts upwards of 24 hours, without any intervening sea breeze. In these months, a passage Land and sea breezes.

* In one of these S. E. gales which happened at Bombay about the beginning of November, 1799, several ships were driven from their anchors in the harbour. It veered to the eastward, and blew a hurricane for some time; the ships Hercules and Hunter drove on the rocks under the castle; the latter was completely wrecked, and the other obliged to undergo a repair. On the same day a dreadful storm happened in Table Bay, at the Cape of Good Hope, when his Majesty's ship Sceptre, with several others, were driven on shore, and part of their crews perished.

may sometimes be made from Cape Comorin to Bombay in eight or tendays. In November, and early in December, the sea breezes are very weak, but become stronger afterwards. As February advances, the land breezes decrease in strength and duration, and are not always regular.

When the land and sea breezes are regular, the latter fail in the evening about sunset, and are generally followed by a calm, which continnes until the land breeze comes off; this may be expected to commence at 8, 9, or 10, P.M.; at first, it comes in fluctuating gentle breezes, but soon becomes steady between N.E. and E.S.E., continuing so till 9 or 10, A.M., next morning; it then begins to fail, decreasing to a calm about mid-day. About this time, or a little past noon, the sea breeze sets in from W.S.W., West or N.W. a pleasant gale; and generally veers to the northward in the evening, then decreasing in strength.

Sailing along the coast.

These land and sea breezes require the attention of the navigator, to benefit by them to the full extent. During the night, with the land breeze, it is prudent to keep well in shore, if the wind will admit without tacking, for there it is stronger and more steady than farther out; but in the morning, it is advisable to edge more out, to get an offing of 5 or 6 leagues, or in soundings of 26 or 30 fathoms before noon, ready for the sea breeze. In the evening, it is proper to be near the shore before the land breeze comes off; it may be approached to 8 fathoms in most places from Bombay to Quilon, and if a vessel get close in, prior to the commencement of the land breeze, she ought to make short tacks near the shore, until it comes off. When calm, its approach is frequently known by the noise of the surf on the beach, which is heard at a considerable distance.

Winds in March and April.

In March and April, the land breezes are very faint and uncertain, seldom coming off till morning, and continuing so short a time, that little advantage is gained by them, as ships are obliged to stand nearly right out to gain an offing ready for the sea breeze. In the former months, the land breezes are generally the strongest winds, but now, the contrary, for the sea breezes prevail greatly. They may, at this time, with propriety be called N.W. winds, for they usually set in at noon about W. by N. or W.N.W., veering gradually to N.W. and N.N.W. in the evening, where they continue during the first part of the night, declining often to a calm about midnight or early in the morning. A faint land breeze sometimes follows; but more frequently, light airs from the northward or calms may be expected, nearly from midnight until the N.W. wind sets in about noon on the following day. These N.W. winds, at the full and change of the moon more particularly, blow strong, producing a short chopping sea, and a drain of lee current, making it necessary to anchor at times with a light anchor when it falls calm, to prevent being driven to the southward.

Sailing to the northward.

Ships bound to the northward at this time will probably experience land breezes between Anjenga and Calicut, but to the northward of Mount Dilly, these will generally fail in strength and duration; they ought, therefore, particularly in April, to be well out in 35 to 40 fathoms about noon, that they may be enabled to make a long stretch to the N.N.E. and N. Eastward with the N. Westerly wind. If they get in shore early in the evening, and the wind be at N.W., it will be proper to make short tacks near the land, until the breeze veer to the northward, which may be expected in the early part of the night; they ought then to stretch off to the N.W. or W.N. Westward, to be ready for the sea wind of the following day, as there will probably be no breeze of any consequence from the land. If the wind continue brisk, a ship will generally gain ground, or hold her own during the night; but if after a north-wester it fall to little wind, with a chopping sea, and a drain of current setting to the southward, she ought

to anchor with a kedge or stream, to prevent losing ground. Late in March,* or in April, when a strong north-wester sets in, it is liable to continue two or three days, or longer, rendering it impossible for a ship to gain any ground when working near the coast; at such times, it is advisable to stand out to sea about 20 leagues or more, where these winds are generally moderate, and the sea smooth, which will enable her to gain ground, and make a better passage to Bombay, than by persevering to work against the chopping sea and drain of adverse current, which generally prevail near the shore when the north-westers blow strong.

Weather during the S.E. monsoon.

In December, January, and February, when the land and sea breezes are regular, the sea is remarkably smooth near this coast, and the sky very serene without any clouds.† This clear weather continues frequently till April, without rain during the whole of the N.E. monsoon; but in April the weather becomes hazy, and at times cloudy over the land in the evenings, with light showers. In this month, the passage up the coast is rendered very tedious by strong north-westers; in some years, however, strong southerly winds have been known to blow along the whole extent of the coast in April, which continued for several days Ships have been known to sail to Anjenga and other ports to the southward at the commencement of these winds, which carried them to Bombay in five or six days; but such instances are uncommon, for southerly winds seldom happen in April.

Winds and weather in May.

In May, the prevailing winds are from N.W. and West, but often very variable and uncertain, with cloudy threatening weather at times, lightning from S. Eastward, and light showers of rain. A gale from S.W. or Southward, is liable to happen in this month, by which several ships have speedily run along the coast to Bombay; but it is prudent to keep well out from the land, prepared for bad weather, to prevent being driven on a lee shore, if a storm should set in from W. S. Westward. When N.W. winds prevail, the weather is settled and clear; but cloudy and threatening, when they blow between S. E. and S.Westward. It sometimes happens, that heavy clouds collect over the land in the evenings, producing a hard squall from it with rain about midnight; this has frequently been experienced between Mangalore and Barsalore, both in May and in June, where these land squalls blow in sudden severe gusts, through the gaps formed between the mountains.

To proceed to the northward in May.

When a ship bound to Bombay is on the southern part of the coast, late in April or in May, if the wind be favourable with steady weather, she may steer to the northward, keeping a good offing towards the Laccadiva Islands. Being clear to the northward of these islands, she ought, if the weather is unsettled and cloudy, with variable winds, to endeavour to obtain a greater offing, in order to have good sea room, in case a gale should happen. If the weather is favourable, an equal advantage will be obtained when she is 2° or 3° from the land, as the sea is more smooth for working than in shore, where a short chopping swell usually prevails, and a drain of current setting to the southward during strong N.W. winds.

If a ship be on the southern part of the coast at the time mentioned above, and meet

* These north-westers sometimes happen in the springs early in March; so early as the 10th or 11th of February, 1791, a strong gale at North prevailed about 30 hours off Choul, brought us under reefed topsails, during which we lost ground.

† During the early voyages of the Portuguese on this coast, storms appear to have sometimes happened in January; at present this is the most pleasant month of the fair season. April 20th and 21st, 1782, a very heavy storm blew from the southward on most parts of the coast, in which H.M.S. Cuddalore, the Revenge, and several other ships, foundered with their crews; the Essex, Nancy, and others, were dismasted. Since that time, no severe storm has happened so early in the season; but about the latter end of April, and early in May, several ships have suffered by S.W, and southerly gales, which have been experienced in some seasons.

with N.W. winds, she ought to stretch off without loss of time to the westward of the islands by passing to the southward of Seuheli-par, between it and Minicoy, or through any of the Laccadiva channels. When well to the westward of the islands, she will be ready to benefit by the approaching westerly winds, or to take every advantage of the shifts, should they continue from N.W. and Northward.

South-west monsoon.

THE SOUTH-WEST MONSOON sets in earlier on the southern part of the coast than at Bombay, the difference in time being frequently 15 or 20 days between Cape Comorin and that island; the fair weather sets in proportionably sooner to the southward, where ships may anchor in September with safety, or even in August, if care be taken to lie well out, ready to proceed to sea on the appearance of a gale; though a severe one seldom happens in August or September, on the coast to the southward of Mount Dilly.

Weather in June and July.

Late in May, or early in June, the S.W. monsoon usually sets in on the southern part of the coast;* frequently commencing with a gale from S.E., veering to South and S.W., where it ultimately becomes fixed; at other times, it commences with squalls from S.W., and a heavy sea rolling in upon the shore. In June, after the monsoon is set in, the wind keeps mostly between S.W. and W. by S., with severe squalls at times, much rain, and a high sea. In July, the weather is nearly the same, becoming a little more settled as the month advances, the squalls veering sometimes to West and W.N.W. The sky is mostly obscured by heavy clouds during these months, precluding observations for several days at a time, but considerable intervals of fine weather have been experienced in some seasons. Ships have left Bombay Harbour so late as the 6th or 8th of June, and with fine weather, passed down the coast without making a tack, the wind prevailing at W.S.W. and West, steady breezes; but such favourable seasons are seldom experienced.

Weather in August.

In August, the monsoon does not blow so violently as in the preceding months; the squalls then veer to West and W.N.W., particularly on the southern part of the coast, N.W. and W.N.W. winds are those which prevail in this month, near Anjenga and Cape Comorin.

Weather in September.

In September, the weather becomes more moderate, the westerly and W.N.W. winds being more prevalent than any other in this month; the squalls *now* are seldom severe, although the weather is often cloudy and threatening, with heavy showers of rain. A great swell often rolls in from the W.S. Westward in this month, particularly during unsettled squally weather, which sometimes happens.

Winds to the westward of the islands, from November to March.

From the early part or middle of November, to the latter end of February, when land and sea breezes prevail along the coast, at the distance of 3° or 4° from it, and in the vicinity of the Laccadiva Islands, the wind blows in steady breezes generally between North and N.E., frequently veering three or four points during the 24 hours, resembling land and sea breezes, or night and day winds.

In March and April.

In March and April, at the same distance from the coast, the winds keep mostly between North and N.N.W., veering two, three, or four points during the 24 hours, but continue longest at N.N.W.

* Between Cape Comorin and Anjenga, the S.W. monsoon, *viz.* stormy weather from S. Westward, may be expected to commence between the 20th and 28th of May; between Mount Dilly and Goa, early in June; and at Bombay, from the 6th or 8th to the 15th of June. To this statement, there are however exceptions, for in some seasons the bad weather has been known to set in at Bombay early in June; and in other seasons, not until the 15th of the same month about Mangalore. Steady southerly winds frequently prevail at Bombay with dry hazy weather, for several days prior to the approach of stormy weather; at other times, it is preceded by West, W.N.W., or N.W. winds, but most commonly those from W.S.W. and S. Westward.

In May, at the same distance from the land, they become variable, veering at times to the westward when the S.W. monsoon is near. During the monsoon, they blow strong between S.W. and West, with a high sea; but the weather is generally more favourable here than near the coast, there being fewer squalls, and much less rain; although in some seasons ships have been dismasted at a considerable distance from the coast, in June, when the monsoon commenced with severe storms. During the S.W. monsoon.

In September, when the S.W. monsoon fails, the winds outside the bank of soundings at a considerable distance from land, veer to the N.Westward, where they continue until the commencement of the N.E. monsoon, some time in November.

What has been mentioned relative to the prevailing winds throughout the year, at a distance from the coast, may be applied to the whole extent of sea from the parallel of Bombay, to lat. 5° or 6° N., among the Laccadiva Islands, and for a considerable distance to the westward of them, in the open sea. But in March, N.N.E. winds mostly prevail, with a S. Westerly current, when far to the westward of the Maldiva Islands.

THE CURRENT, on the Malabar Coast, is generally very weak and uncertain in November, except about Anjenga, and between it and Cape Comorin there is at times, in this month, a strong set to the S. Eastward, along the shore. Between Anjenga and Cape Comorin there is sometimes, in January, a current setting to the northward. Current in November.

From November to March, when the weather is generally fine, with land and sea breezes, there is seldom any current on the coast. But between the islands and the African coast, it sets with the monsoon to the S. Westward. No current from November to March.

In March and April, when N.W. winds blow strong, a drain of lee current is generally impelled before them, along shore to the S. Eastward; at other times, there is little or no current. In these months, about the Laccadiva Islands and to the Westward of them, it sets mostly to the southward or S. Westward; particularly in March, when the N.E. monsoon continues throughout this month at times, or even to the 5th or 6th of April, in the open sea between the islands and African coast; the current then sets with the wind to the S.W. It may be observed, as a general rule, that in this sea the current is governed by the wind always setting to leeward when the latter blows from one direction any considerable time. Current in March and April.

In May, the current mostly sets to the southward, from 4 to 6 or 7 miles per day, but near the southern part of the coast, about Anjenga and Cape Comorin, it sets sometimes stronger; in this month, and also in June, it however often happens that there is little or no current near the coast. When the wind veers to the southward in these months, it brings with it a current setting along shore to the northward; this is always the case on the northern part of the coast, about the entrance of Bombay Harbour. In the open sea, to the westward of the island, the current in these months sets usually to the eastward. Current in May and June.

In July, when the rains have swelled the rivers, producing great outsets, the current begins to set stronger along the coast to the southward: at the entrance of Bombay Harbour, there is seldom any southerly current experienced, the freshes setting directly out to the westward, and the flood and ebb tide counteracting each other; but a little to the southward of Bombay, the southerly current is generally found to run from 10 to 15 miles per day, augmenting to 18 and 20 miles as the distance is increased to the southward. This southerly current continues during August and September, strongest between Cochin and Cape Comorin, where it frequently runs from 20 to 30 miles in 24 hours, in August, September, and the early part of October. In general, Current from June to November.

the current diverges a little from the direction of the coast, when the freshes are strong out of the rivers, although at times it inclines towards the shore; between Calicut and Anjenga, in the latter end of September and beginning of October it has been found at times to set E.S.E. and S.E. from 1 to $1\frac{1}{2}$ miles per hour.

This southerly current setting along the coast is not constantly experienced, being liable to obstructions from various causes, particularly when the wind hangs far south, and blows strong. So late as the end of July, the current has, at times, been found to set weak to the northward, between Anjenga and Cape Comorin, but this seldom happens.

In July and August, to the westward of the islands, in the open sea, the current sets to the eastward with the wind; in September and October it sets to the southward.

Directions. Ships bound round Cape Comorin sail from Bombay in every month of the year, but at the *present* time none attempt the passage up the coast after May, until September is considerably advanced.* The passage to the northward in September and October is rendered very tedious, by adverse winds and currents on the southern part of the coast. In the Anna, we made the land over Anjenga, 18th September, 1793; found the winds at N.W. and variable, with frequent light airs, and a constant strong current to the southward. This obliged us to anchor frequently when the breezes failed, to prevent being driven back by the current. The weather seemed threatening at times, with heavy showers, and some light squalls from the sea, which produced a considerable swell setting in upon the shore.

On the 11th of October, we reached Mount Dilly; there, the southerly current failed, and was succeeded by a small drain to the northward two days, and on the 21st we reached Bombay.

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## LACCADIVA ISLANDS,† AND THE ADJACENT BANKS, WITH THE NINE AND EIGHT DEGREE CHANNELS.

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Laccadiva Islands. LACCADIVAS, or LACCADIVES, is the general name given to the Archipelago of low islands opposite the coast of Malabar, extending from lat. 10° N. nearly to 12° N., or if including the Bassas de Pedro and other banks, to the parallel of 13° 48′ N. Most of these islands are surrounded by steep coral reefs, and there are also some detached reefs amongst or near them. The islands being low with the trees just visible above water, are commonly avoided by navigators; but there are safe and wide channels among them.

* It is, however, remarkable, and evinced great nautical skill and perseverance among the English navigators of early times, that some of them effected a passage up the Malabar Coast, nearly in the strength of the S.W. monsoon. The ship Bengal Merchant, from England, Captain Perse, on the 17th July, 1686, made the coast at Anjenga, anchored in 19 fathoms off Quilon on the 20th, and remained here some time; on the 14th August, she moored at Calicut, left it on the 19th, passed Mount Dilly on the 23rd, and arrived at Bombay Harbour on the 7th of September. These dates are supposed to be those of the old style, or 11 days later than the present calculation.

† The longitudes of these islands and dangers here given have been corrected by Captain Moresby's chronometric measurements from Mangalore, which is considered to be in lon. 74° 53′ E., according to the Trigonometrical Survey.

BASSAS DE PEDRO, or PADUA BANK, and CHERBANIANI BANK or REEF, were explored in February and March, 1828, by Captain R. Moresby, in the Thetis, Bombay cruizer, in consequence of the loss of the ship Byramgore,* on a reef situated between the northernmost of the Laccadiva Islands and Cherbaniani Bank, not previously known to navigators: Captain Moresby has given the following description of these banks and dangers. Banks and Dangers.

Bassas de Pedro, or Padua Bank, is a bank of soundings 70 miles in extent from lat. 12° 30′ to 13° 40′ N., between the meridians of 72° 28′ and 72° 53′ E., having on the northern part soundings usually from 24 to 28 fathoms, and on the southern part 28 to 33 fathoms, sand, shells, and rotten coral:—the water on the bank is not discoloured, so as to indicate soundings, and the edges of it are steep. Bassas de Pedro Bank.

To the N.W. of the bank last mentioned there is a smaller bank, having on it depths from 25 to 30 fathoms, the bottom of the same quality as the other; this small bank extends from lat. 13° 33′ to 13° 49′ N., the centre being in lon. 72° 21′ E., and it is from 2 to 5 miles in breadth.

CHERBANIANI REEF of coral rocks, visible at low water, is dangerous to approach, having no soundings half a mile off; and on the northern and southern extremities there are two sand banks about 8 feet above high water mark. The extent of the reef is 7 miles, or from lat. 12° 15′ to lat. 12° 22′ N., its western edge preserving nearly a straight line N. ½ W. and S. ½ E., and the eastern edge forms a semicircle from the north and south points of 3 or 4 miles in breadth. The south point is 2° 53′ West from Mangalore, by chronometers, or in lon. 72° 0′ E. The flood was found to run N.W. and the ebb S.E. 1 mile per hour on the springs; high water at 11 hours on full and change of the moon. Cherbaniani Reef. Tides.

The Richmond struck on the west side of this bank in the night of the 25th March, 1736, and backed off without damage; in the morning detached rocks and breakers were observed to extend North and South about 4 or 5 leagues, and about a league in breadth. She made this danger in lat. 12° 21′ N., and there appeared a sand bank on its northern extremity.

BYRAMGORE SHOAL is of considerable extent, and the coral rocks of which it consists are just discernible at low water; it is of conical shape, broadest at the southern part, where the east and west points bear E. ½ S. and W. ½ N. distant 4½ miles from each other:—there is a small curve to the northward between these points, mid-way betwixt which, the Byramgore was wrecked, in lat. 11° 48′ N., lon. 71° 55′ E., or 5 miles West from the meridian of Cherbaniani Reef. The N.W. point is in lat. 11° 54′ N., lon. 71° 50′ E., bearing from the S.W. point N. 28° W., distant 8 miles. From the N.W. point of the reef in a N.E. direction, a bank of coral rock extends as far as lat. 12° N., with depths on it from 8 to 4 fathoms, the coral distinctly visible, and the edges of this bank are steep from 7 fathoms to no bottom. The eastern side of it bears about North and N. by W. from the S. Eastern point of Byramgore Shoal; and excepting on this bank to the north of the Shoal last mentioned, there are no soundings near it or Cherbaniani Reef, which renders the approach to them very dangerous, as the noise of the surf would not be heard unless a ship were to leeward in calm weather; and the current frequently sets 12 or 15 miles during the night, in uncertain directions, Byramgore Shoal.

* This ship left China August 10th, 1827, with a valuable cargo for Bombay, beat down the China Sea, touched at Anger, Sunda Strait, for refreshments, September 25th, and struck on the above reef at 3 A.M. 17th November.

although usually between S.E. and S.W. during the months of February, March, and April.

The Amherst cruizer, in December, 1827, proceeded from Mangalore to the wreck of the Byramgore, passed to the northward of, and in sight of the Islands Chittae and Betra-Par;—when the latter island bore E.S.E., seen from the top-sail yard, the wreck of the Byramgore appeared like a large rock bearing N.W. ½ N., and the reef extending from it to N. by W. When the Island Betra-Par seen from the main top bore S.E., the breakers on the Byramgore Shoal were visible from the mast-head bearing West. By the foregoing remarks, it appears that a ship may pass through the channel betwixt Byramgore Shoal and the North-westernmost of the Laccadiva Islands, called Betra-Par; also between the Byramgore Shoal and Cherbaniani Reef, by keeping in lat. 12° 8′ or 12° 10′ N.; but neither of these channels ought to be adopted excepting during fine weather, or in case of necessity; although the passage to the northward of those dangers over the bank of Bassas de Pedro is thought to be safe, as no shoal water has been found upon the latter bank. Captain Charles Keys, late Master Attendant at Bombay, transmitted an account of these dangers, published by him at that presidency, stating that the ship Competitor, from Colombo, bound to Bombay, on the 21st August, 1827, observed in lat. 11° 30′ N., and then saw one of the Laccadiva Islands bearing E. by S., distant about 4 leagues, which was thought to be Peremul-Par, from which time steered N. ½ W. 3½ miles, North 10½ miles, W.S.W. 4 miles, S.W. by W. 3½ miles, and W. by N. 3½ miles, when at 2½ A.M., she struck on a shoal, supposed to be Betra-Par; and after throwing part of the cargo overboard to lighten the ship, she backed off the shoal at 7 A.M. much damaged, as several of the bottom planks, and 50 feet of the main keel, were obliged to be replaced after her arrival at Bombay. Capt. Keys thinks it probable, that it might have been the Island Kittan seen on the 21st of August, and not Peremul-Par, as they supposed, and that she struck on a shoal to the westward of the former, and afterwards passed to the eastward of Chittae, the Byramgore Shoal, and Cherbaniani Reef, at no great distance, without seeing either of these dangers.

*Another Shoal, position uncertain.*

*Betra-Par.*

BETRA-PAR, the N. Westernmost of the Laccadiva Islands, bearing about W. by S. 10 leagues from Chittae, is a small island, or sand bank, with some trees on the northern part; it lies on the N.E. extremity of an extensive coral reef, which stretches to the westward about 4 miles, and then to the southward in a semicircular form; after reaching lat. 11° 29′ N., it turns round to the N.E., and stretches due North till its eastern verge joins to the island. At the S.E. part of the reef there is a small islet, and several rocks appear above water, on which the sea breaks very high. Close under the south side of the principal island is a gap in the reef with 2 fathoms water, where in fine weather a small vessel or boat might lie for a short time. The Grantham, on the 8th of October, 1713, at 5 A.M., ran on the western part of this reef, and after throwing part of her cargo overboard, fortunately hove off by a kedge anchor laid out in deep water, the reef being very steep. Betra-par was seen by the Hope, which ship made it in lat. 11° 35′ N. Captain Wedgebrough, in his survey of these islands, in 1795, sailed close round the reef, and made the island in lat. 11° 35½′ N., and 1° 26′ W. from Underoot, by chronometer. Captain Moresby, in his late examination of the islands and dangers, places it in lat. 11° 35′ N., lon. 72° 17′ E.

*Peremul-Par.*

PEREMUL-PAR, in lat. 11° 9′ N., lon. 72° 6′ E., by Captain Moresby's survey, is a small low isle or sand bank, near the N.E. end of a great coral reef, which stretches

to the southward 5½ miles, and about the same distance to the westward of the island. This reef is of triangular form, with soundings close to it on the S.W. side, and round the N.W. point, or angle. Its N.E. extremity is in lat. 11° 11′ N., the south end in 11° 5′ N.; between which and Bingaro there is a safe channel 4 leagues wide.

BINGARO, in lat. 10° 55′ N., is a small island, about 2 leagues N.E. by E. from the north end of Aucutta. TINGARO is another small island about 2 miles E.N.E. from the former, and these two small islands are encircled by a coral reef, which projects from 2 to 3 miles N.W. and westward from Bingaro, but very little to the eastward of Tingaro, where it is steep to. Bingaro. Tingaro, and adjacent banks.

From the N.E. end of Aucutta to the western extremity of the reef surrounding these two small islands, there is a bank of coral, with soundings on it from 5 or 6, to 9 or 10 fathoms, where a vessel might anchor occasionally with a chain. About 3 leagues E. S. Eastward from Tingaro is situated the western limit of the large bank of soundings, which extends from Pittie northward to Ameni.

AUCUTTA ISLAND, central lat. 10° 51′ N., lon. 72° 17′ E., by Captain Moresby's chronometers measured from Mangalore, extends N.E. by N. and S.W. by S. 3 or 3½ miles, the breadth about half a mile. It is well inhabited, planted with coco-nut trees, and seems a little higher than the small islands in its vicinity. At the distance of a mile from its south point, and joined to it by a reef, is the small island Calpooty, with soundings near it on the south side; and from this island a coral reef projects to the West and N.W., in the form of a semicircle, distant about 2 miles from the west side of Aucutta, and joins to the bank at its north end. On the edge of the reef, directly West from the northern extremity of the island, are soundings, where a vessel might anchor in case of necessity, but the bottom is coral rock. The channel between these islands and Seuheli-Par Reefs is 13 or 14 leagues wide. Aucutta.

CIHTTAE, in lat. 11° 40′ N., lon. 72° 48′ E., by Captain Moresby's survey, bearing N.W. by W. from Kittan about 7½ leagues, is about 1½ or 2 miles in extent N.W. and S.E., with a coral reef stretching around its western side, distant 1 or 1½ miles from the island, and joining to each extremity. This is the N. Easternmost of the Laccadiva Islands. Between all of them the channels appear to be safe, although seldom frequented. Chittae.

KITTAN, in lat. 11° 27′ N., lon. 73° 5′ E., by Captain Moresby's survey, bearing S.E. by E. from Chittae about 7½ leagues, extends N.N.W. and opposite, about 2½ miles, having a circular reef encompassing it on the western side, at the distance of 1½ or 2 miles, which joins to each end of the island; and a bank projects from its S.E. end to a considerable distance. Kittan.

CARDAMUM, central lat. 11° 13′ N., 72° lon. 10′ E., by Captain Moresby's chronometers, bearing nearly S.W. from Kittan about 6 leagues, is in length 4 miles, extending N. by E. and S. by W., but scarcely 1 mile in breadth. On the west side it has a coral reef, stretching out nearly 2 miles, and embracing both ends of the island; near the south point of the reef there are soundings of 16 and 20 fathoms, about half-way between this island and Ameni, from which it bears N.N.E. ¼ E., distant 2 leagues. Cardamum.

Ameni.

AMENI, in lat. 11° 6′ N., lon. 72° 49′ E., by Captain Moresby's survey, bearing about N.E. by N. from Pittie, is of circular form, 1 or 1½ miles in diameter, and surrounded by rocks to a small distance; close to these, on the west side, there are soundings, but between this island and the N.E. extremity of the bank extending from Pittie, there appears to be a gap with very deep water.

Pittie.

PITTIE, in lat. 10° 45′ N., lon. 72° 38′ E., by the above-mentioned survey, is a sand bank about 6 feet above the sea, without any shrubs or verdure, bearing from Courutee N.N.W. ½ W. 14 or 15 miles. It is generally covered with birds, and on the east side of the bank there is a black rock resembling a wreck. This sandy isle or bank seems to present an area of not more than 2 acres, and is probably in part inundated during the S.W. monsoon.

Bank of soundings.

From Pittie, an extensive rocky bank of soundings projects 3 or 4 leagues to the N. Westward toward Tingaro, and about 6½ leagues N. Eastward towards Ameni; from hence it stretches southward nearly on the meridian of Courutee, within 3 or 4 leagues of this island. The soundings on this bank, so far as it has been examined, are from 7 to 20 fathoms.

Courutee.

COURUTEE ISLAND, in lat. 10° 31′ N., lon. 72° 43′ E., or 1° 2′ West from Underoot by chronometer, is about 2½ miles in length nearly N.E. and S.W., and 1 mile in breadth; although not large, it is valuable to the natives, by affording good water, and two species of excellent coco-nuts. A steep coral reef encompasses the south and west sides of this island, projecting 2 miles in some parts; the east side is also steep and rocky; the proper entrance is at the N.E. end of the island, but the boats of the natives pass through other parts of the reef. On the extremity of the reef, at the S.W. end of the island, there is a coral spot where a vessel might anchor in case of necessity, with a chain fixed to a small anchor.

Tides or currents.

The tides or currents have a velocity at times of 2 miles an hour, and never set *direct* upon any of the islands, but generally *along* them, or along the edges of the reefs, lessening the danger to be apprehended in calms. This isand bears N.E. about 10½ leagues from the northern Seuheli-Par; the channel between them *appears* to be clear of danger.

Seuheli-Par Islands.

SEUHELI-PAR, or SEUVELLI ISLANDS, are two in number, very small and low, each about 1¾ miles in circumference, and bearing about N.N.E. ¼ E., and opposite from each other, distant 7 miles. The southern island is in lat. 10° 0′ N., lon. 72° 21′ E., by the survey, bearing nearly West from Kalpeni 27 or 28 leagues, and the direct track between them appears to be clear of dangers.

Dangers.

The northern island has a coral spit with soundings from 4 or 5, to 10 or 12 fathoms on it, which projects out about a mile to the northward of the island, and where the only passage appears to be in the reef, through which boats can proceed to the southern island. They are not inhabited, except when boats come here from the other islands in the fair season to fish. The water procured by digging is salt and unfit to use; a kind of soft wood for fuel may be got on the northernmost island, but the other abounds most with coco-nuts, although of a saline quality, and very unpalatable.

From the reef that surrounds the northern island, one edge of it stretches to the southward, the other edge to the S. Westward, surrounding the southern island, and extending from it about 5½ or 6 miles to the S.W., the southern extremity of this great reef being in about lat. 9° 56′ N.

The reef being steep, should not be approached without great caution, by ships

passing these islands; many of the black rocks on it are considerably elevated above water; and the currents are strong at the full and change of moon, when the rise and fall of tide is 6 feet, and the time of high water a little before noon, not always regular. Tides and Currents.

In coming from the westward great caution is requisite, for, exclusive of the great reef surrounding these islands, another reef may *possibly* be detached from the Great Reef, according to the following account given by the officers of the ship Anne.

April 9th, 1804. "At 11 P. M., the ship Anne, from the Red Sea, struck on a reef, and bilged before day-light. From the wreck, the northernmost Seuheli-Par Island bore E.S.E. 4 or 5 leagues, and the southernmost island S.E. about 6 leagues; the reef from S.W. to E.N.E. being 10 or 12 miles in extent." Wreck of the Anne.

The distance estimated from the wreck to the islands is certainly too great, for they could not be discerned so far; but if the bearings are tolerably correct,* the reef on which this ship was wrecked is farther from these islands than hitherto supposed. These two islands, and the reef surrounding them, form the south-western limit of the Laccadivas.

ELICALPENI BANK, about $4\frac{1}{2}$ or 5 miles in diameter, of circular form, bears N.E. $\frac{1}{2}$ N. from Underoot Island, distant 10 or 11 leagues, and from Mount Dilly 27 leagues; its central lat. 11° 13′ N., lon. 74° 3′ E. by Captain Moresby's survey, in 1828, or 1° 30′ W. from Tellicherry, by Captain M'Cluer's chronometers in 1790, who made the lat. 11° 15′ N. This bank is composed of sharp coral rocks all over; the least water found on it by Captain M'Cluer, during an examination of two days, with three vessels, was 6 or $6\frac{1}{2}$ fathoms; but it ought to be avoided by large ships, particularly in the S.W. monsoon, for a large ship would probably strike on it when the sea is running high,† which has been already mentioned under the directions given for sailing from Bombay to the southward in the S.W. monsoon. Elicalpeni Bank.

UNDEROOT, in lat. 10° 47′ N., lon. 73° 45′ E., by Captain Moresby, in 1828, or 1° 48′ W., from Tellicherry, by chronometers, is low, well planted with coco-nut trees, about $3\frac{1}{2}$ miles in length East and West, and $1\frac{1}{4}$ miles in breadth; it is defended by a wall of coral rocks all round, through which there is only one small passage for boats. This island on the south side is steep to the coral wall, but to the North and N.E. an extensive coral bank projects to the distance of 5 or 6 miles, with various depths from 8 and 10, to 16 fathoms. About a mile from the island, the bottom on this bank is sandy in 10 and 12 fathoms, where vessels might anchor during southerly winds, abreast the houses scattered along the north side of the island. The bank is steep, and the soundings on both the exterior and central parts of it are generally 10 and 12 fathoms over a bottom of coral. Turtle may be got here, and the water is tolerably good; the natives are poor and inoffensive. This island is about 38 leagues distant from Mount Dilly, which is the nearest land of the continent, and it is the most proximate of the Laccadiva Islands to the Malabar Coast. From Kalpeni, it bears North, a little easterly, distant 14 leagues; the channel between them is clear of danger. Underoot. Supplies.

* Which seems very doubtful, for Captain Moresby could discover no appearance of danger about the situation assigned to the reef on which the Anne was wrecked, which was probably on the edge of the great reef, and the estimated distance from the islands over-rated at the time of the misfortune.

† The mountainous sea, rolling over this rocky bank during the strength of the S.W. monsoon, appears sometimes to break on it: for the Minerva of Bombay, in 1787, bound to China, by getting too far from the coast in blowing weather, passed close to it in the night, which was discovered by the sea rolling over it in high broken waves.

Kalpeni.

KALPENI, extending from lat. 10° 3′ N., about N. by E. ½ E. to lat. 10° 9′ N., is composed of two narrow low islands,* joined together by a reef above water, having two islets close to the S.W. end, where its greatest breadth is about three-quarters of a mile.

This island is in lon. 73° 44′ E., or 3° 5′ W. from Anjenga, by Captain M'Cluer's chronometers, in 1790. On the west side, a steep coral reef, with rocks above water, projects nearly 2 miles, and joins to the two extremes of the island. This reef is steep on the outside, with high breakers, no soundings till close to the surge; through one part of it, there is a narrow channel with only 1½ and 2 fathoms water, and from 3 to 4 fathoms on the Coral Flat inside. The boats of the natives lie at the S.W. part of the island, nearly South from the gap or channel in the reef, about 3 miles distant. The southern or largest island, where are a few small villages, is well planted with coco-nut trees, and has soundings 9 or 10 fathoms at the south end, corally bottom.

Nine Degrees Channel.

THE NINE DEGREES CHANNEL, bounded to the southward by Minicoy Island, and to the northward by Seuheli-Par and Kalpeni Islands, is about 36 leagues wide, and clear of danger. The southern extremity of the reef that surrounds Seuheli-Par, is in lat. 9° 56′ N., from which Minicoy bears S.S.E. ¼ E., and from Kalpeni it bears S. by W. ¾ W., about equal distance from both, 36 or 37 leagues.

Directions to sail through it.

During the strength of the N.E. monsoon, or at other times when light or variable winds prevail, a ship pursuing this route, may keep nearly in mid-channel, in from lat. 9° to 9° 20′ N., or rather nearest to the north side, if the wind blow steady from that direction, as the currents frequently set to the southward among those islands in both monsoons; although they set sometimes to the northward, when the winds are light or variable in the N.E. monsoon. But in borrowing toward the north side of the channel, do not approach the Seuheli-Par Isles in light winds, on account of their extensive reefs. With northerly winds, this channel seems preferable to the other south of Minicoy, as a ship will not be so liable to drift near the head of the Maldiva Islands, should the wind become faint, and the current be setting to the southward.

Minicoy.

MINICOY, or MALICOY ISLAND (the centre), in lat. 8° 17′ N., lon. 73° 7′ E., or 3° 42′ West from Anjenga, by chronometers, is about 6½ miles in length and half a mile in breadth, extending in the form of a crescent from N.E. to S.W., with the concave side to the N.W., where a circular coral reef projects about 3 miles, and is joined to the extremes of the island. On the reef near the west point of the island, there is an islet with trees on it; and at the north end of the island, there is a passage through the reef, with 2 fathoms the deepest water, through which the boats and small vessels pass, but it is narrow and intricate. Where the boats lie within the reef, the water is deeper, 2½ and 3 fathoms over a bottom of hard coral, but chains would be necessary to secure a vessel, were there any swell. This island is very populous, and the natives are hospitable; it is well planted with coco-nut trees, and may be seen from the deck of a large ship about 3½ or 4 leagues.

Eight Degrees Channel.

THE EIGHT DEGREES CHANNEL, although not so wide as the other north of Minicoy, described above, is nevertheless very safe, and about 23 leagues broad, formed between the head of the Maldiva Chain and Minicoy Island, the latter being nearly on the same meridian as the Head of the Chain, distant about 23 leagues.

* The largest is called Kalpeni, and the northern one Cheria, by the natives.

In passing through the Eight Degrees Channel, it is prudent to keep nearer to Minicoy than towards the Maldivas, as the current sets generally to the southward, particularly in light winds, and during the N.E. monsoon, although it changes at times, and sets to the N.W. and Northward: but in the strength of the S.W. monsoon, mid-channel is the best track, or rather inclining toward the head of the Maldivas, if the wind should happen to blow strong and steady at S.W. or South. Directions to pass through the channel.

Ships coming from the westward, bound to Ceylon or the Bay of Bengal, in the strength of the S.W. monsoon, should not pursue the route through the One-and-a-Half-Degree Channel, the Equatorial Channel, or any of the southern channels of the Maldivas, or to the South of all these islands; they may, in such case, adopt either the Eight or Nine Degrees Channel at discretion, although this route is more circuitous than the former.

With the wind steady at S.W., and a ship's situation correctly ascertained by observation, the Eight Degrees Channel may be followed, as it is rather more direct than that to the north of Minicoy; brief directions for passing through these channels will be found in the section, "From the COMORO ISLANDS toward INDIA."

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# THE MALDIVA ISLANDS.

PRINCIPALLY FROM THE SURVEY AND DIRECTIONS OF CAPTAIN MORESBY, OF THE INDIAN NAVY.

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Captain Moresby commenced his survey of these islands in 1834, and completed it in 1836, having under his command the surveying vessels Benares and Royal Tiger, and two tenders. His longitudes were measured by chronometers from Bombay and Ceylon, allowing Bombay Flagstaff to be in 72° 54′ 51″ E.

"Navigators in general are not aware," says Captain Moresby, "more particularly those coming from Europe, that the whole group of the Maldiva Islands are inhabited by a civilized race of people, who carry on a considerable trade with the British possessions in India; more particularly Bengal, Ceylon, and the Malabar coast, as also to the Red Sea; and are expert navigators and sailors. Schools for teaching navigation are on some of the islands. They make and repair nautical instruments, such as the astrolabe and quadrant. On one occasion I was much susprised in seeing a wooden sextant very neatly made by them; the glasses and telescopes had been fitted from old instruments; they copy our nautical tables, generally using our figures, and translate the rules in our navigation books into their own language. They are an inoffensive, timid people, and there appears far less crime among them than with more polished nations; murder is not known among them, nor is theft or drunkenness; being strict Musselmen, they are forbidden the use of spirituous liquors, which could be easily made from the fermented juice of the coco-nut tree, which they have in abundance. General remarks.

"They are governed by a Sultan, whose title and rank are hereditary; under the Sultan are five Viziers or Ministers of State, as also the Head Priest, and Judge,

civil and religious; the Hendeggeree, or Custom Master, is also a very great man; and last of all is the Emir el Bahr, or Master-Attendant of the Port; all these reside at Māle, or King's Island.

"To the different Atolls are appointed one or two chieftains, or, as they are styled, Atoll Warrees; as also a Catib to each Atoll; the Catib is priest and judge. Every Atoll pays a certain fixed revenue, a portion of their produce, to the Government at Māle, and none are allowed to trade with foreigners or strangers, except at Māle.

"The men, in appearance, are of a dark copper colour, rather short, and in person not unlike the natives of Ceylon and the Malabar coast; but their language is totally different; their women are not pretty, and are extremely alarmed at the sight of strangers. These islanders have been more than kind in their hospitality to shipwrecked mariners, which was exemplified in their humane and liberal conduct towards the commander, officers, and crew of two vessels, the Adonis and Vicissitude, who were totally wrecked during the night, one on Colloomandoo Atoll in 1835, and the other on Hewandoo Atoll in 1836; nor would they accept of any payment, though liberally offered it by the Government of India: they accepted of presents from our Government as a mark of friendship, of which I had the honour of being the bearer."

Maldiva Islands.

THE MALDIVA, or MALDIVE ISLANDS, are a range of innumerable low islands and rocks, extending nearly on a meridian line, from lat. 7° 6′ N., to lat. 0° 40′ S.: the larger islands abound with coco-nut trees, and are generally inhabited; but many of the others are only sand-banks or barren rocks. The greatest breadth of the range is about 20 leagues, and the islands are formed in large groups or clusters (sometimes double), which are called by the natives Atolls, or Atollons. These Atolls appear to be the summits of submarine coral mountains, rising very abruptly to the surface of the sea, and having an almost unfathomable depth of water outside of them, but enclosing within the crater-like ridges which bound them banks of soundings, of varying depths, from 10 to 30 or 40 fathoms. The islands of each Atoll generally lie in a continued chain on the barrier ridge which bounds it, although there are many on the interior banks, which, in addition to the islands, are generally studded with rocky patches and banks. There are 19 Atolls, with several detached islands or rocks in the channels that separate them, some of which are wide and safe, as will be seen hereafter: but some of these channels are intricate, and only fit for vessels that row with oars, as the currents run strong through them to the eastward or westward, generally with the prevailing winds.

Besides the channels which separate the different Atolls, there are numerous openings* through their exterior reefs, used by the Maldiva boats in passing from one Atoll to another, some of which have no soundings, or very deep water, and will admit large ships. Soundings are seldom got in the channels which separate the Atolls, nor until close to their outer reefs; but within the exterior reefs, they have moderate depths, a bottom of coral and sand, with very smooth water, affording safe anchorage.

Better known formerly than at present.

Although these islands have long been thought to present an impenetrable barrier of 470 meridional miles, to ships bound to Ceylon, or the southern part of Hindoostan, and have, consequently, been *dreaded* and *avoided* by modern navigators, yet the

* These passages or gatways, are called *Bari* by the natives, and are very deep. There are generally one or two of these gatways at the extremities of each Atoll, admitting a passage to the boats if driven to leeward by the tide or current, in crossing over from one Atoll to another.

early traders from Europe to India appear to have been much better acquainted with them than we until lately were, and often passed through some of the channels which separate the Atolls, *without apprehension of danger*.

## THE ATOLLS AND MINOR CHANNELS.

HEAWANDOO PHOLO ATOLL, the most northern of the Maldiva groups, is about 13 miles long, from N.W. to S.E., and 7 broad. The islands lie principally on its boundary and are 24 in number, 7 of which are inhabited, and afford wood, water, and some supplies. The depths in the interior of the Atoll vary from 10 to 34 fathoms. The small island of Turacoon, which lies on the extreme north point of the Atoll, is in lat. 7° 6′ N., lon. 72° 58′ E. The south part of the Atoll is formed by a large reef, called Dhigthur or Dhig Reef, the south point of which is in lat. 6° 55′ N. To the northward of this reef on the bank lies the island of Heawandoo, which being the residence of the Sultan's Vizier, is considered the principal island of the Atoll. It is about a mile in length and is covered with high coco-nut and bread-fruit trees. It is easy of access, and possesses safe anchorages in all seasons. During the S.W. monsoon, Captain Moresby recommends a berth on the east side of the island, between it and a small reef dry at low water, which lies half a mile N.E. of the centre of the island; and in the N.E. monsoon, an anchorage between the island and the large reef to the southward in 16 or 17 fathoms. Captain Moresby has recommended this island as a coal depôt for steamers. Heawandoo Pholo Atoll.

TILLA DOU MATTE, and MILLA DOU MADOU ATOLLS are united, and form one large group, extending from lat. 6° 59′ N. to 5° 39′ N., and having a general width of from 12 to 16 miles. There is no deep channel between these two Atolls, and they are only distinct in name, the boundary which separates them being a comparatively narrow part of the bank in lat. 6° 30′ N. There are about 38 islands in Tilla Dou Matte, the northern Atoll; all those on the north and east sides being inhabited, and affording good water and some supplies. The general depths on the bank of sounding are from 20 to 28 fathoms. Milla Dou Madou Atoll contains 101 islands, 29 of which are inhabited by a population amounting to 1,700 or 1,800 persons. Tilla Dou Matte, and Milla Dou Madou Atolls.

The islands are more numerous on the S.E. part of the Atoll, and there are no dangerous reefs on it. The general depths are from 20 to 30 fathoms. There is good anchorage in 25 fathoms at Man-ah-doo Island, either on its north or south sides, according to the season. This island lies near the S.E. extreme of the Atoll in lat. 5° 47′ N., and is described by Capt. Moresby as "a beautiful island, filled with groves of bread-fruit trees and other luxuriant foliage; it contains 100 inhabitants, whose village is on the north side of the island. There is a good landing place on the north and south sides of the island, and a pathway through it; good water and some supplies may be obtained."

The tides are felt in both these Atolls, but are much influenced by the currents. Tides.

MALCOLM ATOLL is a large lagoon reef, unknown to Europeans before Capt. Moresby's survey, on which, according to the natives, many ships have been wrecked. It has two islands near its N.E. extreme, and one near the centre of its eastern side, and is nearly 15 miles long, N.N.E. and S.S.W., and between 3 and 4 broad. Its N.E. point is 9 miles from the western barrier of Milla Dou Madou Atoll, and is in lat. 6° 25′ N. The larger of the two islands which lie near this point is called Mah-koondoo, and is inhabited; it also affords good water. Malcolm Atoll.

Mahlos Madoo Atoll.

MAHLOS MADOO ATOLL extends from lat. 5° 1′ N. to 5° 55′ N., the meridian of 73° E. passing through its centre. It is divided into two parts by the Moresby Channel, which is about 2 miles wide and 13 miles long, having its western entrance in lat. 5° 19′ N., and leading through the Atoll in a N.E. by E. ½ E. direction. There is also a narrower passage through the Atoll just to the southward, and leading from the western entrance of the Moresby Channel, due East through the Atoll.

Off the north extreme of the Atoll lie two islands called Powell Islands, connected by a reef, between which and the Atoll there is a deep passage two miles wide.

The islands of the northern Mahlos Madou Atoll lie principally in a continued chain on its eastern side; there are 20 in this chain, and they have good channels between them. The only one affording good water is Fainoo, the residence of the chief, and the second island from the south extreme of the range, in lat. 5° 28′ N. The western boundary of the Atoll consists in a number of lagoon reefs, and many small islands and banks are scattered over the central part of the Atoll. The islands of the southern Mahlos Madou are chiefly on the S.E. side. Hee-tah-doo is the principal island, and is at the south extreme of the Atoll, in lat 5° 1′ N., lon. 72° 58′ E.

Paddipholo, or Phaideepholo Atoll.

PADDIPHOLO, or PHAIDEEPHOLO ATOLL, is a circular Atoll, to the westward of that just described, and about 10 miles to the southward of Milla Dou Madou Atoll. There are only four of its islands now inhabited, and these are on its N.W. side. The principal, being the residence of the chief, is Narforee, in lat. 5° 26½′ N.

Horsburgh Atoll.

HORSBURGH ATOLL is small, and lies 6 miles to the southward of Mahlos Madou Atoll on the meridian of 73° E. The three principal islands, which are on its northern side, are inhabited, and afford good water and some supplies. There is a passage into the Atoll between the barrier reefs on its south side, and there is good anchorage inside in 17 and 20 fathoms, on a sandy bottom mixed with mud and clay.

Cardiva, or Cardoo Island.

CARDIVA, or CARDOO ISLAND, lies 9 leagues E. by N. from Horsburgh Atoll, and gives the name to the channel in which it lies, and which is hereafter described. The island is nearly 2 miles long, and a little more than half a mile broad, and is covered with high coco-nut trees. A semicircular reef on its N.W. side connects the two extreme points of the island, forming within a lagoon, the entrance to which is near the N.E. point of the island, and is marked by a few sticks as a beacon. This passage is available for boats only. The island affords good water and some supplies, and contains about 200 inhabitants.

Māle Atoll.

MĀLE ATOLL, the north point of which is 11 miles South of Cardiva Island, extends from lat. 4° 47′ N. to 4° 10′ N., and in its centre is 22 miles broad. There are numerous channels leading into the Atoll which might be used by ships, but, according to Captain Moresby, "it requires a sharp look-out even in the day, to navigate through it, the coral reefs and patches are so numerous; the eye, and not the chart, must guide a vessel through." He further remarks, that the channels are not distinctly seen when at 3 or 4 miles' distance, the barrier reef appearing continuous so as to be alarming to a stranger, but on approaching within one or two miles the channels become clearly visible.

The north part of this Atoll is formed by an extensive circular lagoon reef, sepa-

rated from the main body of the Atoll. There is a channel between them on the parallel of 4° 42′ N.

MALE, OR KING'S ISLAND, is at the south extreme of the Atoll, the flagstaff on its north side being in lat. 4° 10′ N., lon. 73° 34′ E. It is the residence of the Sultan and the seat of his government, and was once completely fortified by a wall and bastions; but only the north and west sides of these fortifications are now in a state of repair. Māle is the only Atoll allowed to trade with foreign vessels. Captain Moresby was commissioned by the Indian Government to attempt a treaty which should authorize a trade with all the other Atolls, but without effect. Māle, or King's Island.

Their principal exports are coco-nuts, tortoise-shell, dried fish, coir rope, money, cowries, and mats. Their vessels are from 100 to 200 tons burthen, and there are several small brigs belonging to the natives of Ceylon and Chittagong, which trade annually to this place. Māle, exclusive of the other islands, contains a population of between 1,500 and 2,000.

During the S.W. monsoon, from June to December, vessels anchor on the east side of a lagoon reef 1½ miles N.N.W. of Māle Island: on the edge of the reef are several anchors, dry at low water, to which vessels make fast in this season, being steadied by an anchor let go to the eastward. The climate is very unhealthy, and strangers are liable to suffer much from it; no one, therefore, ought to sleep on shore if it can be avoided.

SOUTH MĀLE ATOLL extends from lat. 4° 7½′ N. to 3° 49′ N., and contains 22 islands, 3 only of which are inhabited: none of them afford either good water or supplies. This Atoll is separated from Māle Atoll by a channel 2 miles wide, called the Wardoo Channel. South Māle Atoll.

The tides are strong in this channel, and are increased in strength by the currents, which sometimes run 4 miles an hour, causing ripplings and whirlpools.

ARI ATOLL is one of the western Atolls, and is comprehended between the parallels of 4° 17′ N. and 3° 30′ N. Its eastern side is nearly on the meridian of 73° E., and its general width is about 16 miles. There are numerous channels by which a vessel may enter the Atoll, those on its western side being the broadest. The north part of the Atoll is convenient for anchoring, the dangers being visible and the depths from 25 to 29 fathoms. Ari Atoll.

ROSS ATOLL is a small Atoll or lagoon reef, about 4 miles off the N.E. part of Ari Atoll. It is named Ross Atoll in compliment to Capt. D. Ross, of the Indian Navy. Ross Atoll.

To the northward of Ross Atoll, at the distance of 5 miles, is Too-doo islet. It is safe to approach, and contains upwards of 200 inhabitants: it has good water and some supplies.

PHA-LEE-DOO ATOLL is of an irregular shape, and has its greatest length East and West. The island of Phoo-lee-doo, on its north extreme, is in lat. 3° 41′ N., lon. 73° 28′ E., and gives the name to the channel between this and the South Māle Atoll. The Phoo-lee-doo Channel is 7 miles wide. Pha lee-doo Atoll.

NILLANDOO ATOLLS lie North and South of each other, between lat. 3° 22′ N. and 2° 40′ N., their centres being on the meridian of 73° E. They are 12 or 14 miles wide, and there is a channel between them. Nillandoo Atolls.

The little island of Himmittee, near the N.W. part of the north Nillandoo, contains between 200 and 300 inhabitants; it sends five or six vessels or boats annually to Bengal as traders, and there is a school in the island for the instruction of the native youths in navigation. The encroachments of the sea have of late years much diminished the size of this island. The fresh water on it is bad.

Moloque Atoll.

MOLOQUE ATOLL lies to the eastward of the Nillandoo Atolls just described, and south of Pha-lee-doo Atoll. Between it and the latter is the circular lagoon reef called Wah-ter-oo, with a deep channel both North and South of it. The island of Moloque, from which the Atoll is named, is the innermost of several islands lying on its eastern side, and is just within a large channel leading into the Atoll. The island may be distinguished by a large banyan tree near its north part. It is in lat. 2° 57′ N., lon. 73° 38′ E., and affords good water, plenty of wood, and a few supplies; the passage south of Moloque Island being nearly a mile wide.

Collomandoo Atoll.

COLLOMANDOO ATOLL is extensive, being from 22 to 28 miles across, and is nearly circular. The barrier reef is almost unbroken, leaving but few passages into the Atoll, and the interior is covered with numerous coral patches which dry at low water. On its western side are two conspicuous islands, between which there is a passage into the Atoll. The northern island is called Karn-doo-doo, and the southern He-lan-doo, the latter being in lat. 2° 16′ N., lon. 73° 1′ E.; both are inhabited, and afford good water, wood, and poultry. Besides the passage already mentioned, there are several others both on the N E. and S.E. sides of the Atoll. The Atoll is comprehended between the parallels of 2° 34′ and 2° 10′ N.

Near the south part of this Atoll, among several other islands, is that called Vai-man-doo, which gives the name to the channel formed between this Atoll and Adou Matte, the next to the southward. The Vai-man-doo Channel will be hereafter described.

Adou Matte Atoll.

ADOU MATTE ATOLL is 26 miles long N.E. and S.W., the southern part being semicircular, and the northern part pointed to the N.E. The east point of the island of Esdoo, which lies at its N.E. extreme, is in lat. 2° 7′ N., lon. 73° 40′ E. There is a wide and safe passage into the Atoll near its south point, between the islands of Hee-nadoo-adoo and Gah-doo, with several other islands just within the entrance of the passage: these may be passed on either side as most convenient.

Suadiva, or Hooahdoo Atoll.

SUADIVA, or HOOAHDOO ATOLL, South of Adou Matte Atoll, is very extensive, and is comprehended between the parallels of 0° 55′ N. and 0° 11′ N., and between the meridian of 73° 0′ E. and 73° 35′ E.

The interior of this Atoll is deeper than that of the other Atolls, being from 35 to 45 and 50 fathoms, and is much less obstructed by coral reefs and patches. Its islands are very numerous, and there are 15 of them inhabited, containing together a population of about 2,000. The men are employed in fishing, and the women in the manufacture of rush mats for couches. Some directions for ships entering either by the north or south passages of the Atoll will be found in the descriptions of the One-and-a-Half Degree and Equatorial Channels.

Phoowa Moloku Island.

PHOOWA MOLOKU ISLAND, hereafter mentioned in the description of the Equatorial Channel, is nearly 2 miles long from N.W. to S.E., and one mile broad;

it is steep, except on the S.E. side, off which a bank extends more than a mile; the sides of this bank are steep, no bottom being found at from 40 to 130 fathoms near it, but vessels may anchor on its extreme point if the weather be moderate. The island contains between 300 and 400 inhabitants, and there is one of the royal family from Māle, or King's Island, residing on it: he is styled Deedee. The trees on the island are lofty. Turtle, fowls, eggs, fruit, firewood, and fresh water may be procured from the natives. It is high water at full and change of the moon at 1 o'clock; the rise of tide being between 4 and 5 feet. Tides.

ADDOO ATOLL is the southernmost of the Maldivas, and the smallest, being only 10 miles from East to West, and 7 miles from North to South. It is nearly a crescent in shape; convex towards the South, and concave towards the North. There are nine comparatively large islands and several smaller ones; the two principal islands lie, one at the N.W. and the other at the N.E. points of the Atoll, the rest being ranged along its exterior boundary. There are four channels by which vessels may enter the Atoll, two on the north and two on the south sides, the latter being the larger. The two northern channels are not easily seen at a distance, and they are narrow; but may be known by a small bushy islet and a high bank of coral stones, both on the reef which separates the channels. The southern ones are readily seen, and, according to Captain Moresby, may be entered at night; the western of the two (Gung Channel) is half a mile wide, with from 13 to 17 fathoms in it; the eastern one (Willing-gilly Channel) is a mile wide, with from 17 to 20 fathoms water in it, both deepening as a vessel advances towards the centre of the Atoll. Addoo Atoll.

Captain Moresby attaches considerable importance to this Atoll, from its position and resources, and recommends it as a coal depôt. The islands of this Atoll, he observes, "afford a few supplies of fruit, limes, poultry, eggs, and water, and firewood in abundance. The natives are very civil and obliging, and will exchange their articles for money, rice, biscuit, sugar, salt, onions, and garlic; they are extremely lazy and indolent, and very fearful of strangers, and will not be induced to assist a ship in wooding and watering unless paid for it and obliged to work. They are under the government of the Sultan of Māle, or King's Island, and the Atoll-Warree, or chief of the Atoll, is the person to be applied to for assistance in getting supplies." They manufacture cotton cloths, which they sell to the other Atolls; they are forbidden to trade with foreigners, and all their produce must be sold at Māle.

This Atoll being to the southward of the equator, is not within the constant influence of the monsoon; the weather is variable, but the N.E. monsoon is felt in January, February, and March; the westerly winds prevailing in July, August, and September. The currents about this Atoll are strong, changing with the monsoons, but influenced by the variable winds. They commence setting westward about January, and eastward about June, with an average velocity of from 40 to 50 miles per day. Captain Moresby found no variation of the magnetic needle in 1836. Currents.

## PRINCIPAL CHANNELS.

Although there are deep navigable channels between all the Atolls, there are only four which should be generally adopted by ships, more especially by night: these channels are the Cardiva Channel, the Vaimandoo Channel, the One-and-a-Half Degree Channel, and the Equatorial Channel.

THE CARDIVA, or CARDOO KANDOO CHANNEL (sometimes called the Cardiva, or

Cardoo Kandoo Channel.

Five-Degree Channel), near the parallel of 5° N., is about 25 miles wide, and is formed by Paddipholo, South Mahlos Mahdoo, and Horsburgh Atolls on the North, and by Māle, Ross, and Ari Atolls on the South. The small island of Cardiva or Cardoo, which gives the name to the channel, lies in its eastern entrance in lat. 4° 58′ N., nearly mid-way between Paddipholo and Māle Atolls. There is also another small island called To-doo, near the western entrance of the channel, about 5 miles North of Ross Atoll. According to Captain Moresby, no ship ought to attempt to work through the channel against the strength of either monsoon with the current also against them, but the passage may be advantageously made with a fair wind, or during the light variables, at the change of the monsoons. A ship intending to pass through the channel from the eastward should, according to his recommendation, steer into lat. 5° 5′ N., lon. 73° 47′ E., and from this position make a straight course S.W. by W. ½ W., passing about one mile south of Cardiva Island; and a ship from the westward should get into lat. 4° 34′ N., lon. 72° 47′ E., and steer directly through on the opposite course N.E. by E. ½ E.

The flood tide in this channel runs E.N.E., and the ebb W.S.W., and it is high water at full and change at 12 o'clock. During the N.E. monsoon little or no flood is felt, and the velocity of the ebb is considerably increased by the strong currents, and *vice versâ* during the S.W. monsoon. The N.E. monsoon prevails from the middle of November till the beginning of April, with fine weather and generally moderate breezes to the northward of Māle, and to the southward variable winds with frequent squalls and rain. From May to December, west and south winds with squalls and rain prevail.

Vaimandoo Channel.

THE VAIMANDOO CHANNEL is formed between Colomandoo and Adou-Matte Atolls, and is about 15 miles broad. The course through it is N.E. by E., or S.W. by W., which is the general direction of the shores of the two Atolls which bound the channel. The distance through it may be considered to be about 30 miles, and it is perfectly safe, although, from its inferiority to the One-and-a-Half Degree Channel immediately to the southward of it, it would be comparatively little used. The centre of its eastern entrance is in lat. 2° 16′ N., and of its western entrance in 2° 1′ N. It is high water in this channel at full and change of the moon at 3 h., rise about 4 feet, the flood running to the east and the ebb to the west, with a velocity of about 2 miles per hour at spring tides.

Tides.

One-and-a Half-Degree Channel.

THE ONE-AND-A-HALF DEGREE CHANNEL, between Adou-Matte Atoll on the North, and Suadiva Atoll on the South, is 50 miles wide, the south point of Adou-Matte Atoll being in lat. 1° 46′ N., and the north point of Suadiva in 0° 56′ N. This channel is free from danger, and is soon passed through; but should a ship be drifted near the south point of Adou-Matte, there is a passage between the barrier reefs, 2 miles wide, by which she may enter the Atoll. The passage is about 3 miles to the eastward of the extreme south point of the Atoll. Should she, on the other hand, be drifted near the north point of Suadiva, there are several entrances between the reefs by which she may reach an anchorage in the interior of the Atoll. Captain Moresby mentions a good anchorage in 10 fathoms, with the island of Mah-Fooree bearing West one mile. Mah-Fooree is the largest island among those on the N.W. part of the Atoll, and is in lat. 0° 51′ N.

Equatorial Channel.

THE EQUATORIAL CHANNEL is formed between the south point of Suadiva,

in lat. 0° 12′ N., and the north point of Addoo Atoll in lat. 0° 35′ S., or perhaps more strictly between the south point of Suadiva and the small island of Phoowa Moloku, the north point of which is in 0° 16½′ S., the Equator consequently passing nearly mid-way between them. The entire width of the channel between Suadiva and Addoo Atoll is 47 miles, and it is free from danger, except near the island of Phoowa Moloku, which has a bank extending nearly 2 miles from its south part, on which the surf breaks to the distance of three-quarters of a mile from the island. On the extreme point of this bank, however, a vessel may anchor in 6 or 7 fathoms when the weather is moderate. The natives from the island frequently visit ships in passing, if they shew their colours, and supplies of turtle, fowls, eggs, fruit, wood, and water may be obtained here.

A ship passing either way through the channel with light winds should borrow towards Addoo Atoll, in order to avoid drifting near Suadiva: but should this happen, a vessel in the day might easily enter one of the many channels near the south part of the Atoll, and anchor inside of the barrier reefs. Between the South and S.E. points of this Atoll, there are, according to Captain Moresby, 8 channels, all safe and available for entering the Atoll. Should a vessel not be able to return by the channel through which she entered, she may, adds Captain Moresby, "in the day-time steer boldly to the northward through the Atoll, in deep water, from 35 to 45 fathoms, passing occasionally some small coral reefs and islands, hauling to the eastward or westward as her destination may be, that she may pass through some of the channels either on the east or west side of the Atoll. Some of the natives will gladly conduct a ship through for a few pounds of rice or bread."

### MINOR CHANNELS.

*Geelando Channel.*

THE GEELANDO CHANNEL, between Heawandoo Pholo Atoll and Tilla Dou Matte Atoll, is about 2 miles wide at its western entrance, increasing to 9 or 10 in width, the extent of the channel being about 15 miles, in an E.N.E. direction. The ebb tide runs to the westward and the flood to the eastward, and it is high water on full and change at 9h. 30m., with a rise of 5 feet. Captain Moresby found no bottom in this channel at 220 fathoms. *Tides.*

*Koodah-hooah-doo Channel.*

THE KOODAH-HOOAH-DOO CHANNEL leads between Nillandoo and Moloque Atolls on the North, and Collomandoo Atoll on the South; is a safe and clear channel, and is from 9 to 15 miles wide.

## GULF OF MANAR.

*Passage from Cape Comorin to Point de Galle.*

POINT DE GALLE bears from Cape Comorin S.E. ¾ E., distant 66 leagues. Ships crossing from the Cape in the S.W. monsoon ought not to steer a direct course, as they may be liable, *at times*, to experience a current setting to the eastward into the Gulf of Manar; a S.E. or S.E. ½ S. course will therefore be proper, according to circumstances, until they get nearly in the latitude of Point de Galle; they may then

steer to the eastward and make it in day-light, if bound to the Bay of Bengal or the Coromandel Coast; but it will be prudent to approach the coast about Point de Galle with great caution during the night, on account of sunken rocks interspersed at a considerable distance from the shore. Ships bound to the eastern parts of India have no occasion to keep close to the south coast of Ceylon, at least not to lose time by so doing. The current sets into the Gulf of Manar only at times during the S.W. monsoon, for it usually runs about S.S.E. or South in this track; but it would be imprudent to make the island of Ceylon to the westward of Point de Galle, for if the wind veer to the southward, it might be difficult to get round that place, which has been already noticed, under the section of sailing from Bombay to the southward in the S.W. monsoons.

During the N.E. monsoon, a direct course may be followed from Cape Comorin to Point de Galle; the wind blowing then from the Gulf, is generally more fair for ships passing from the former to the latter, than in returning towards the Cape; for in this season, ships keep near the west coast of Ceylon to Caliture or Colombo, before they stretch across from Cape Comorin.

Passage from Point de Galle to the Malabar Coast.

In December and January, when the N.E. monsoon blows strong out of the Gulf of Manar, it is certainly advisable for ships proceeding from the south part of Ceylon to the Malabar coast not to stretch off until they have coasted along to Caliture; then they may steer over for the Cape close hauled, and will find the N. Easterly wind increase greatly in strength as the Gulf is opened. When they approach the land about the Cape, it will draw more to the eastward, and afterwards become variable, inclining to land and sea breezes, when near the land to the westward of the Cape Mountains.

Winds and currents.

About the changes of the monsoons, the winds often prevail from the westward between Cape Comorin and Ceylon, accompanied, *at times*, by a current setting into the Gulf, which render it advisable for ships passing from the south part of the island towards the Cape, in October, November, March, and April, to steer direct from Point de Galle for it. In the two former months, some ships have been set to the eastward by the current and W.S.W. winds, so far as to make the coast of Madura, near Manapar Point; in crossing from Caliture late in March, 1801, the same happened to us in the Anna, noticed in the description of the coast near Cape Comorin.

From March to November, westerly winds prevail greatly off the S.W. end of Ceylon; it is then difficult for a ship to get to the westward from Point de Galle, and after April it is too late to proceed from thence to the ports on the Malabar Coast, until October is advancing.

Even in April, being off the South or S.W. part of Ceylon, bound to Bombay, if a ship can make considerable progress against the westerly winds, it will be prudent for her to pass through the Eight or Nine Degrees Channel, and to the westward of the Laccadiva Islands, making short tacks occasionally in passing them, to keep up her westing. She will then avoid being embarrassed by the coast, and probably escape bad weather, which is very liable to happen near it, in May; and may reasonably expect to reach her port of destination more speedily than keeping near the land, in the track used during the fair season.

Madura, or Tinevelly Coast.

THE MADURA, or TINEVELLY COAST, which forms the N.W. side of the Gulf of Manar, is little frequented, except by small vessels from the neighbouring coasts, particularly those from Colombo and Negombo, which trade to it.

East Cape.

About $5\frac{1}{2}$ leagues E. by N. from the low sandy point of the *true* Cape Comorin,

there is a round projecting part of the coast called the East Cape by some navigators, having on its eastern side a considerable bay, with a tuft of trees elevated more than the other land, and the appearance of an inlet or river: this place is called Covolam.

Manapar Point; adjacent coast described.

MANAPAR POINT, in lat. 8° 22′ N., lon. 78° 7′ E.,* or 32 miles East from Cape Comorin by my chronometers, in the Anna, bears N.E. by E. from the Round Point, or East Cape, distant 8 leagues; the shore between them is woody, curved a little, concave where the bay is to the westward, and a little convex to the eastward, in lat. 8° 16′ N., where there are some houses, and a single white house a little farther to the eastward. The whole of the coast is level, and covered with trees from Cape Comorin to 1 or 2 miles eastward of this white house, with mostly regular soundings, 9 or 10 fathoms, about 4 or 5 miles off shore. A little to the eastward of the white house, the shore becomes barren, and stretching about 4 miles to the E.N.E. of it, terminates in Manapar low sandy Point, above mentioned. There is a high building† with a flag-staff on it, situated on Manapar Point; and when it bore N. by W. three leagues, then in 13 fathoms, we could perceive no more land beyond it to the eastward.

Captain J. Edgecumbe, of H. M. S. Psyche, found the soundings irregular round Manapar Point, which has a shoal projecting about 4 or 4½ miles N.E. by N. from it; other dangerous shoals are said to lie to the eastward. When the church on Manapar Point bore N.W. by W., and Trichindore Pagoda N. ½ W., the Psyche shoaled suddenly from 12 to 4½ fathoms at one cast of the lead. Captain Edgecumbe recommends ships working up along this coast, to keep well to the eastward of all the shoals, till in sight of the two shoals which lie off Tutacorine; this is more necessary off Manapar Point, as one of the Pearl Banks, with 4 fathoms on it, bears E. by S. from that Point, distant 4 leagues; although there is a channel between it and the reef that projects from the Point.

From Manapar Point, the coast turns round to the N.W. and northward, forming a semicircular bay, then projects out in another point, upon which stands Trichindore Pagoda, about 3½ leagues to the N. Eastward of the former; and nearly north, about 3½ leagues farther, is situated the village and road of Punnecoil, where ships may ride well, sheltered from the S.W. monsoon. Between this place and Manapar Point, the coast is generally low near the sea; having on it some churches, or other buildings, and should not be approached under 10 fathoms, on account of several rocky banks fronting the shore, at a considerable distance.

Trichindore.

TRICHINDORE PAGODA, in lat. 8° 30′ N., lon. 78° 11¼′ E., situated on the Point, about mid-way between Manapar Point and Punnecoil, is a high cylindrical tower, which answers as a sea-mark, and a little to the northward of it lies the village Coilpatnam.

Punnecoil.

PUNNECOIL is in lat. 8° 41′ N., lon. 78° 11′ E., where water, firewood, sheep, hogs, and fish may be got, but very few vegetables. The greatest danger in sailing to the anchorage is an extensive reef that stretches from it to the southward, along the coast to Trichindore Pagoda Point, which should not be approached under 7 fathoms, particularly in a large ship: to keep clear of it, a ship ought not to come nearer than

* Captain Wedgebrough, in his survey of the Gulf of Manar, in 1795 and 1796, places Manapar Point in lat. 8° 23′ N., lon. 78° 20½′ E. Lieutenant G. Lewis made it in lat. 8° 22′ N.

† Said to be a church belonging to the natives, many of them being Nestorian Christians.

The road. 10 fathoms till Trichindore Pagoda bears S.W. by W., then steer in W.N.W., and anchor in 6, 7, or 8 fathoms, soft bottom, with the flagstaff of Punnecoil bearing W. ½ S., distant 2½ miles from the bar, and Polanis, or Carpenter Island, North. There is 7 fathoms close to the north point of the reef, on the outside, and 4 fathoms within it, where small vessels are sheltered from easterly winds.

The ship St. George, of Surat, unfortunately got into the gulf in the S.W. monsoon, and took shelter at Punnecoil. She anchored 23rd June, 1791, in 6½ fathoms, mud, with the flagstaff West, extremes of the land from North to S. ½ W., off shore 2 miles, where she remained till the force of the S.W. monsoon abated in September.

From the anchorage, in clear weather, the Ghaut mountains are discernible, the southern part nearest Cape Comorin bearing S.W. by W., and the sharp peak over Anjenga seen in sailing along the Malabar coast, W. by S.

Tutacorin and coast to the eastward. TUTACORIN, or TUTACARINE, in lat. 8° 48′ N., lon. 78° 12½′ E., the largest town on this part of the coast, is 3 or 3½ leagues to the northward of Punnecoil; the channel for boats or small vessels passing between them is inside of Carpenter Island, and the other near it, which are joined together by a reef; and the depths in it are 2½ and 3 fathoms. Carpenter Island is easily known by the storehouses on it resembling a fort, near which is a tope of trees; and it seems to lie about 1½ or 2 miles from the shore.

Abreast of Tutacorin, and from thence to Adam's Bridge, there are several dangerous rocky banks, some of them 3 or 4 leagues off shore, with small islands interspersed along the coast, rendering it unsafe for large vessels to navigate amongst them. On these banks a pearl fishery is carried on, sometimes not very productive; but from Tutacorin, a considerable quantity of the sea-shells, called shank, is exported. The Tides. tides on this coast are not very regular; the rise and fall from 3 to 5 feet; high water about 2½ hours on full and change of moon at Tutacorin. Between this place and Point Ramen are several villages along the coast, among which Deviapatam, in lat. 9° 29′ N., and Tondy, in lat. 9° 45′ N., are the chief.

Adam's Bridge, and land contiguous. ADAM'S BRIDGE is a narrow ridge of sand and rocks, mostly dry, forming the head of the Gulf of Manar, and nearly connecting the island of Ceylon with the continent. It extends nearly E.S.E. and W.N.W. 6 or 7 leagues, the east end joining the Island Manar, which lies close to Ceylon, and the west end joining the Island of Ramisseram, which lies close to a peninsula of the continent, the extremity of which is called Point Ramen, and a tuft of trees on it. Between Manar Island and Ceylon there is a narrow gut, navigable only by the trading vessels; on the whole extent of Adam's Bridge there is said not to be above 3 or 4 feet water at high tides in any part. The only channel frequented by the trading boats is that at the western part, between Point Ramen and Ramisseram Island. On the east end of this island there is a fort, called Tannacudia; the Pagoda is in lat. 9° 18′ N., and the village of Pombon lies at the west point, opposite to Point Ramen on the mainland; between them, ridges of rocks, partly above water, stretch across, having a chasm or channel about 100 feet broad, near the point of the island, through which the country trading boats pass backward and forward, between the coasts of Malabar and Coromandel. They are obliged to unload part of their cargoes, and receive it again after passing through this channel, in which the greatest depth over the shoal rocky bottom at high water is about 5 feet, and 2 or 2½ feet at low water; but in November, December, and part of January, there is said to be rather more water, when it is propelled into the gulf

during strong gales. The bottom is hard rock, and it continues more or less shoal about 300 yards. The distance from the point of the island to that opposite on the main is about $1\frac{1}{2}$ miles, and the channel is called by the natives Odi-aroo, or Serpent's River, situated in lat. 9° 17′ N. The current runs 3, $3\frac{1}{2}$, and sometimes 4 miles per hour, through it to the S. Westward in January and February, rising over the dam, and rushing through at times with a descent or fall; at other times, in fine weather, there is little or no current. In the S.W. monsoon the current sets through the passage to the N. Eastward with the prevailing wind, and in accordance with the strength of the latter. There is a kind of tides, which on the springs rise 2 or $2\frac{1}{2}$ feet; high water at $11\frac{1}{2}$ hours on full and change of moon. About 3 or 4 leagues outside the island of Ramisseram and Adam's Bridge, the depths are from 7 to 9 fathoms, increasing quickly in a southerly direction, towards the entrance of the gulf.

Current.

Tides.

It seems to be the prevailing opinion at present, that if a ship were to get into the Gulf of Manar during the strength of the S.W. monsoon, she would find it impracticable to work out into the open sea, until the force of the monsoon abated: and the St. George, mentioned above, did not make any attempt, but took shelter in Punnecoil Road till September.

Of working out of the gulf.

The Company's ships, however, often got into this gulf by mistake, above a century ago, and *seldom* experienced difficulty in escaping from it.

Instances of ships working out of the gulf.

The King William, from England, touched at the island of Mauritius, passed to the eastward of the Maldivas without seeing them, steering mostly North and N. by E. from the equator; on the 14th July, 1700, got soundings 35 fathoms in lat. 8° 11′ N., on the west coast of Ceylon; afterwards, got into 13 fathoms, and saw the low land near Negombo. From the 14th July, kept working to the southward with moderate breezes between S.S.W. and W.S.W., rounded Point de Galle 22nd, and on the 31st arrived at Madras.

The Phœnix, 12th June, 1701, made the land to the eastward of Cape Comorin, and thinking it the east part of Ceylon, steered along shore to the N. Eastward, till informed of their mistake by two Dutch ships in Punnecoil Road, when they anchored. At 11 P.M. weighed, and stood to the W. S. Westward, with a southerly wind, which veered afterwards to W.S.W., then tacked and steered southward to lat. 5° 30′ N., passed Point de Galle 15th June, being bound from England to Madras.

The Wentworth, 30th July, 1702, mistook the low land about Manapar for the Coromandel Coast, and tacked from it in $3\frac{1}{2}$ fathoms. "In the morning, discovering our mistake, worked with southerly and S.W. winds, and a current setting into the gulf till the 13th August, before we were in the latitude of Point de Galle, then bore away round Ceylon, being bound to Bengal."*

The King George, from England, bound to Madras, 14th of June, 1718, "got soundings 35 fathoms, grey sand, at 9 P.M., tacked and lay by, till daylight, then steered N.W. by W. and N. by W., thinking we were on the east coast of Ceylon, till at 8 A.M., being in 20 fathoms, saw low land bearing N.W. distant 3 or 4 leagues; the weather being hazy, hauled off N.N.E., and at 10 A.M. saw a house on a sandy point bearing N.W. 4 leagues, which we took to be Baticolo, but it afterwards proved to be Manapar Point."

"June 15th. At 2 P.M. saw the high land over Cape Comorin bearing West, also a Dutch flag on a fort bearing N.W., under which lay two ships: steered towards the road, and at half-past 3 anchored in $7\frac{1}{2}$ fathoms, sand, with the fort bearing N.W. $\frac{1}{2}$

* Had they worked along shore to Cape Comorin, they would have got sooner out of the gulf.

W., distant 4 or 5 miles, called in the journal Tutacorin, but probably it was Punnecoil; high land over Cape Comorin bearing West. Sent a present to the governor, who furnished us with a good chart of the bay, ours being faulty, and directions for working out, with the set of the current."*

"Strong westerly winds this day, and on the 16th, rode with a cable on the best bower."

"June 17th. Weighed at 11 A.M. yesterday, with the wind at West, and steered S. by W. ½ W. in soundings of 8 to 10 fathoms, keeping the low land in sight; having been advised to keep between 8 and 12 fathoms till Manapar Point was brought to bear W.N.W., which point is 25 miles to the southward of where we anchored. From this point E. by S. 4 leagues lies a pearl bank, with 4 fathoms water on it, which I was advised to pass on the outside, if the wind proved to the southward of west. At sunset having the house on Manapar Point bearing W. by S. distant 5 leagues, with the wind at W.S.W., kept away S.S.E. till 8 P.M. to avoid the pearl bank, which we effected, the soundings increasing gradually from 9 to 20 fathoms, then no ground with 30 fathoms line at 11 P.M. From 8 P.M. with the wind at W. by S. steered South, and at noon observed in lat. 6° 21′ N., from which time steered S.E. 56 miles, then E.S.E. and E.N.E. till sun-rise 18th, and saw the south-west part of Ceylon bearing from N.N.W. to S.E. distant 7 or 8 leagues: arrived 25th at Madras."

The Derby, 9th July, 1720, made Manapar Point, with the church and flagstaff on it bearing N.W. by W., and at first mistook it for the east side of Ceylon, but finding our error, tacked, and stood to the southward, without having occasion to tack again; rounded the Basses 12th, and anchored 17th July, at Madras.†

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## CEYLON; WEST COAST, FROM MANAR TO POINT DE GALLE.‡

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West coast of Ceylon.

FROM the east end of Manar Island to Calpentyn Island there are many dangerous banks scattered along the west coast of Ceylon, rendering the navigation unsafe for

* In my passage great attention was paid to the variation; believing if I were under 4° 0′ W. variation, there would be no danger of falling into Tutacorin Bay; and the accounts received from experienced navigators, that we should see abundance of crabs and snakes in the water, if to the westward of Ceylon, and in Tutacorin Bay, I now am satisfied to be incorrect, having seen none; only we found the water become more pale, but got no soundings till we made the land, and the observed variation was only 3° 30′ West, when at anchor in the Bay.

† The Derby, Captain Fitzhugh, during a preceding voyage, made an opposite and remarkable mistake. Having left the Cape of Good Hope 28th May, bound for Bengal, she made the islands off the west coast of Sumatra 18th July, in lat. 1° 23′ S., and thought them to be the Maldiva Islands, having made 57° 24′ east meridian distance from the Cape. From hence, with S.W., S.E., and variable winds, she proceeded to the southward in sight of the Poggy Islands, and Trieste, calling the latter Jameo, or Gama, and stating it to be the southernmost island at the south part of the Maldivas. Continuing to proceed to the southward, with the high land of Sumatra in sight at times, and Keysers Peak in lat. 6° S. was also seen: still proceeding to the southward, with the view of getting round the south end of this *unknown* part of the *supposed* Maldiva Islands, 2nd August, in lat. 7° S. and 60° 40′ meridian distance east of the Cape of Good Hope, she fortunately spoke a ship, and was informed that the low land in sight was Claps Island, on the south coast of Java. Having about 40 men ill with the scurvy, she proceeded to Batavia for refreshments.

‡ The description of the coast from Berberyn Island to Point de Galle, is taken principally from the

large vessels near the shore; but small ones, drawing 7 or 8 feet water, if acquainted, pass inside, or between some of them.

The east end of Manar is in about lat. 8° 57′ N., having on it coco-nut trees, some houses, and a fort; and in the gut which separates it from the opposite Point Mantotte or Mentole, on Ceylon, theré is said to be 10 or 12 feet water in some places. The anchorage at Manar is on the south side of the island, in 4 or 5 fathoms, about 4 miles to the westward of the gut; or a small vessel may anchor near to Manar in $2\frac{1}{2}$ or 2 fathoms. The island is low, abounding with coco-nut trees.

ARIPO, a village of some trade, with a church, is situated about 4 leagues to the southward of the east end of Manar, at the mouth of the river Arewiaar; small vessels passing from one to the other, keep in $2\frac{1}{2}$ or 3 fathoms water, near the shore. Aripo Village.

The rocky banks or reefs off this place are very dangerous; one lies to the West and S.W. 5 or 6 miles off shore, with 4 fathoms close to it, and the outermost of them are said to be 5 leagues distant from the land. Ships bound to Manar from the southward, when 3 or $3\frac{1}{2}$ leagues to the westward of Cardiva Island, may steer about North till the breakers on the reef are discerned, then haul to the westward about a league in rounding it. From this place, Manar Island will be seen to the N. E., for which they should steer, keeping a good look-out, and the lead going, the soundings being irregular over a rocky bottom, until 7 or 8 fathoms near the island; under these depths, they decrease gradually towards it, to 5 fathoms sandy ground. To sail towards Manar.

In this tract there are sometimes overfalls, from 20 to 25 fathoms, to 2 or 3 fathoms less, at a cast; if a vessel shoal to 8 fathoms hard ground, in passing near the reef or outermost banks, she ought instantly to haul to the westward.

From this part of Ceylon to the Tinevelly coast, soundings extend across the gulf to the southward of Adam's Bridge; but the outer limit of the bank is not exactly known to Europeans, as seldom any other than small coasting vessels navigate the gulf to the northward of Colombo.

CARDIVA, or NALLADIVE ISLAND, about 7 leagues to the southward of Aripo, is very narrow, and of an irregular shape, extending nearly North and South 4 or 5 leagues. It lies nearly parallel with the Ceylon shore, and between it and the main there is a channel for boats. This island is mostly low, with sandy patches in some parts, and bushes or trees in others, but there are ridges of hills moderately elevated on the main behind it: the south end of it is in about lat. 8° 26′ N. This part, in clear weather, may be seen in 15 or 20 fathoms water, at $4\frac{1}{2}$ or 5 leagues' distance from the island. The soundings to the westward, about 4 leagues, are 8 or 9 fathoms rocky bottom. The depths are very irregular under 8 or 9 fathoms, and about a league or more from the shore there is a rocky bank, having on it 2 or 3 fathoms. About 5 leagues N.N.W. of this island is the S. Westernmost of the Aripo Shoals. Cardiva Island.

CALPENTYN ISLAND, to the southward of Cardiva, near, and parallel to Ceylon shore, appears joined to the main land when viewed from the offing. It is low, abounding with coco-nut trees, and extends from lat. 7° 56′ to 8° 18′ N. The fort and village of Calpentyn stand on the north end of the island, between which and the south end of Cardiva, there is a group of small islands, with a larger one, called Long Calpentyn Island.

directions by Mr. Twynam, Master Attendant at Point de Galle, published in the *Nautical Magazine*, Vol. for 1836.

Island, adjoining the north point of Calpentyn, of which it seems part. Close to this vessels may anchor in 4 or 5 fathoms, or farther to the N.E. near Cardiva; but the bottom being mostly rocky and foul, they will be liable to lose their anchors. The best track in, is thought to be near the N.W. side of the island, on account of dangerous overfalls on the rocky banks a little to the northward. The bank of soundings is said to stretch from this island about 6 or 7 leagues to the westward.

From the north point of Calpentyn to Chilau, the distance is about 9 leagues, and when a vessel has got an offing, the course is about S.S.W. along the west side of the island. A reef of rocks stretches along that side, nearly from the middle part beyond the southern point, where it projects nearly 3 miles from the shore, requiring attention to the lead in passing.

The bottom between Calpentyn and Chilau is mostly sand, with coral occasionally; the nearer the former is approached, the worse it becomes for anchoring.

Chilau.

CHILAU RIVER AND VILLAGE, in about lat. 7° 48′ N., may be known by a sand hill, having on it some bushes, and near it there is a round hummock.

In coming from the northward to this place, a vessel should keep 2 miles outside the reef of rocks projecting from Calpentyn, until clear of its southern extremity, then haul in towards the Ceylon shore. Coming from the southward, she may, if bound to Chilau, steer along shore to the anchorage abreast the river.

Marawil.

MARAWIL, a small village known by some topes of coco-nut trees, bears nearly S. by W. from Chilau, distant about 5 leagues. The coast between them may be approached by the lead, the soundings being more regular, and the depths greater than to the northward.

Caymel.

CAYMEL, a small river formed between two points, covered with coco-nut trees, bears nearly S. by E. from Marawil, distant about 4 leagues. The soundings between them are regular, especially near the shore.

Negombo.

NEGOMBO, in about lat. 7° 15′ N., and 2 leagues to the S.S.W. of Caymel, is a place of some trade. The coast between them forms a bight, and should not be approached under 7 or 8 fathoms, then about 2 leagues off shore, until Negombo Flagstaff is brought to bear S.E. by S., by which the rocky ledge projecting from this part of the coast will be avoided, and a rock with 10 feet water on it, and 6 fathoms close to, bearing from the flagstaff, or north point of the fort, N. N.W.

When bound to Negombo from the southward, the fort should be brought to bear S. E.; a ship ought then to steer direct for it, without borrowing any more to the northward, and may anchor in 5 or 6 fathoms abreast the fort. This place may be known by the point which is covered with coco-nut trees, and defended by a reef stretching out a small distance, projecting a great way out. The bank of soundings extends from this part of the coast 6 or 7 leagues.

Colombo.

COLOMBO, in lat. 6° 57′ N., lon. 79° 56′ E.,* by chronometers from Bombay, is distant about 6 leagues South of Negombo; the bottom between these places is mostly

* It was usually placed in lon. 80° 0′ E., but Mr. James Steuart, Master Attendant, states it to be in 79° 52′ E. Lieut. Raper adopts 79° 51′ E. for the longitude of the lighthouse.

mud, with regular soundings, but the coast should not be closely approached, on account of some rocks stretching out about 2 miles from the north point of the small river Matual. The ship Athens, of Bombay, running for Colombo in the night, struck on these rocks, beat over them and received much damage; she was with difficulty warped out, through an intervening small gap. In passing along here, a ship should keep in 10 or 12 fathoms, and she may anchor in Colombo Road in $6\frac{1}{2}$ or 7 fathoms, with the flagstaff or lighthouse in the fort bearing from South to S. by E., off the town $1\frac{1}{2}$ or 2 miles.

Mr. James Steuart, Master Attendant, gives the following useful information for the guidance of ships. A brilliant light now exhibited from a lighthouse in the fort, every night, will direct ships approaching the road, which is 97 feet above the level of the sea. Ships requiring pilots should make the usual signal, to be conducted to the anchorage, which is free from foul ground, and *now* frequented at all seasons of the year, as a severe gale of wind is seldom experienced here. The best berth during the S.W. monsoon, from April to October, is in from 7 to 8 fathoms with the lighthouse bearing South by E. $\frac{1}{2}$ E., and the Dutch church E. by S. In the N.E. monsoon, from November to April, it is more convenient to anchor in $6\frac{1}{2}$ fathoms with the lighthouse bearing South or S. $\frac{1}{2}$ E., and the Dutch church E.S.E. In the night, when proceeding into the Road, bring the light of the Fort Lighthouse to bear S. by E. or S. $\frac{1}{2}$ E., and anchor in 8 or 9 fathoms about half a mile off shore. Mr. Steuart's Directions.

The bar is a bank of sand, with 7 feet water on its shoalest part, the northern extremity being about 400 yards N.W. of the Custom House Point. Small vessels, drawing less than 10 feet water, ride within the bar, protected from the sea and S.W. wind. The sea breaks heavy on the bar in bad weather, rendering the crossing it from the shipping in the outer road dangerous for small boats: the native boats usually pass out and in to the southward of the bar, close to the breakers on the rocky point of the Custom House, which being a narrow pass, should not be attempted by strangers when the sea breaks on the bar; it is best to proceed round to the northward of the bar, easily distinguished by the breakers. Some rocks projecting from the Custom House Point ought to be avoided in passing.

The Drunken Sailor Rock, bearing about S.W. by W. $\frac{1}{2}$ W. from the lighthouse, distant about 2 miles, is very dangerous, being in the track of ships coming from the southward when bound into Colombo Road, in the N.E. monsoon, and the sea not breaking upon it in fine weather; and even in the S.W. monsoon it is not always visible, for at times only a small white roller can be perceived to rise over it once in six or eight minutes. According to the statement of Lieut. Col. Wright, of the Royal Engineers, who examined this rock, it is of an oval shape, 20 or 30 feet in circumference,* having only $3\frac{1}{2}$ feet water on its summit at low tide, and about 6 feet at high water, with nine fathoms very near to it, and 8 or 9 fathoms between it and the shore. Several ships have passed very close to the Drunken Sailor, ignorant of its existence; and others have even passed between it and the shore, without knowledge of the danger; it is avoided in coming from the southward, by keeping in 11 or 12 fathoms water until the flagstaff bear East or E. by S. Drunken Sailor Rock.

Since Ceylon became a British colony, Colombo Road is said to be safe at all seasons, if ships be provided with good ground tackling; nevertheless, some caution is requisite,

* This must refer to the shoalest patch only, at its northern part, where Mr. Steuart found not less than 7 feet on it at low water, and he estimated the ledge to be 100 yards in length, and 20 yards in breadth.

for about 70 years ago, a Dutch Indiaman then moored in the road with good anchors and cables to seaward, during the S.W. monsoon, being rather too far in, was wrecked by the high sea causing her to pitch deep, and strike the ground. Ships late in the season ought to anchor well out, to be enabled to proceed to sea in case of necessity. The Minerva, in 1803, did not arrive at Colombo till the 11th May; she continued there, taking in cargo, and sailed for Europe on the 20th, during which time there was much rain, thunder, and lightning; the weather threatening, with a swell from S. Westward.

Colombo, the seat of the British Government of Ceylon, and principal emporium of the island, is one of the most healthy places in India, abounding with good water and other refreshments; and its exports to Europe, cinnamon, cardamons, coffee, coco-nut oil, coir cordage, ebony, pepper, plumbago, and satinwood.

Adam's Peak.

The land about Colombo is low near the sea, with some hills to the S. Eastward a little way in the country. The high mountain, having on it a sharp cone, called Adam's Peak, is nearest to this part of the coast, being about two-thirds of the distance that it is from the east side of the island.* It is in lat. 6° 52½′ N., and bears E.S. from Colombo, distant 12½ leagues. When the atmosphere is very clear, it may be seen about 30 leagues; but this seldom happens, excepting in the N.E. monsoon, dense vapours generally prevailing over the island during the S.W. monsoon.

A steep bank of coral, about half a mile broad, having 15 fathoms water on it, lies 7 miles West from Colombo, stretching a few miles to the southward, and in a northerly direction towards Negombo, where its surface is sand. The water deepens at once to 23 fathoms outside the bank, and to 28 fathoms greenish sand at 2 miles' distance, which is not far from the edge of soundings. Within the bank are 25 fathoms, gradually shoaling towards the shore.

Panture, and the coast adjacent.

PANTURE, bearing from Colombo about S. ¾ E. distant 4½ leagues, has a small river with two rocks on the north side the entrance, nearly half a mile from the shore; the anchorage is to the southward of these, in 10 or 12 fathoms, off shore about 2 miles. About half-way between this place and Colombo, there are in a small bay, called Galketin, a few houses, to the northward of which, the coast may be approached to 12 fathoms occasionally, about 2 and 3 miles off; but farther to the southward, the shore becomes more steep and rocky, making it prudent not to come under 16 or 17 fathoms towards it, these depths being from 2 to 3 miles off shore. About 2 leagues off, there is from 23 to 26 fathoms, and from 30 to 35 fathoms 4 or 5 leagues off; from whence, the depth increases suddenly on the edge of the bank, to no ground in standing to the westward.

Coast about Caliture.

CALITURE, in about lat. 6° 36′ N., bears S. by E. from Panture, distant about 3 leagues: the coast between them fronting the sea is mostly low and woody, and should not be approached under 15 or 16 fathoms in large ships. This place may be easily known in passing along, by a small fort close to the sea, where the land is a little elevated. Ships should not come under 10 or 12 fathoms, on account of foul ground both to the northward and southward of the fort, except they intend to anchor in the

* It is about 7,000 feet high, and by the Aborigines of the country is venerated under the name of Ham-al-el (or Ham the Sun).

Captain Ross, the Company's Marine Surveyor, in January, 1824, made Adam's Peak 18¼ miles East of Point de Galle Flagstaff by angles taken with theodolite.

road. The mark to steer in with is, to keep the fort between two hummocks, which are near each other, and not far from the shore, the northernmost is the lowest; with this mark, a ship may run in, and anchor in $5\frac{1}{2}$ or 6 fathoms tolerable ground, but it is rocky out in 15 or 16 fathoms.

About S. W. $\frac{1}{2}$ S. from the fort there is a rock, having on it 12 or 13 feet water; small vessels can pass between it and the shore in 4 fathoms, but large ships ought not to come nearer it than 10 or 11 fathoms, for it is said to lie about 2 miles off shore.

BERBERYN ISLAND, in lat. 6° 28′ N., bears about S. by E. $\frac{1}{2}$ E. from Caliture, distant 8 miles; being small, and close to the coast, it is not easily perceived, except when passing near. There is said to be anchorage to the northward of it, in 6 or 7 fathoms, and a small bay farther in, with 2 or 3 fathoms sand, where small craft may anchor; but large ships passing between Caliture and this island seldom come under 17 or 18 fathoms, from 2 to 3 miles off shore. Rocks project from the N.W. end of the island, with 17 fathoms water very near them, which must be avoided in passing. Berberyn Island.

*"OUDAPITTA POINT bears S.S.E. $\frac{1}{2}$ E. from the outer part of Berberyn Island, distant 3 miles, and is in lat. 6° 25′ N., lon. 80° 7′ E., is rocky and of moderate height, with several rocks above water lying off it; W.N.W. from it, at the distance of half a mile, lie the Anderan Rocks, and several others between them and the shore. About three-quarters of a mile North of Oudapitta Point is the entrance of Bentotte River." Oudapitta Point.

"UNAPAYAGALLE POINT, 3 miles S. by E. $\frac{1}{2}$ E. of Oudapitta Point, is low and rocky, having several rocks off it, and between it and Oudapitta Point they extend upwards of half a mile off shore, having outside of them 5 and 6 fathoms water, sandy bottom, with several patches of coral." Unapayagalle Point.

"AHUNGALLE POINT is a low rocky point, S. by E. $\frac{1}{2}$ E., $3\frac{1}{2}$ miles from Unapayagalle Point, and is the southern extreme of some rocky cliffs half a mile in extent, the northern extreme terminating in a hill of considerable height, called Rosgodde Hill. On the summit of the cliffs, near Ahungalle Point, there is a house, which is very conspicuous from seaward." Ahungalle Point.

"THE OUTAREE and CANDA BANKS lie off the part of the coast just described, the north end of the former, which is $2\frac{1}{4}$ miles in length, bearing from Unapayagalle Point West one mile. On the north end of the Canda Bank lies the Nappa Rock, with 2 fathoms water on it, bearing from Ahungalle Point N.W. $\frac{1}{2}$ W. $1\frac{3}{4}$ miles, rather more than a mile off shore. The bank extends S.S.E. $1\frac{1}{2}$ miles, its southern extreme bearing from Ahungalle Point W. $\frac{1}{2}$ S. three-quarters of a mile. The depth of water on these rocky banks is from $4\frac{1}{2}$ to 6 fathoms, inside of them 7 and 8 fathoms sandy bottom, and close outside of them 9 fathoms rocky bottom. There is a passage between the banks about half a mile wide, having in it from 8 to 9 fathoms water." The Outaree and Canda Banks.

"ALUT ROCK is a small rock, having only 9 feet water on it, and 7 fathoms a boat's length from it all round. It bears from Ahungalle Point W. $\frac{1}{4}$ N. $1\frac{1}{4}$ miles, and Alut Rock.

* The passages marked as quotations are from Mr. Twynam's remarks.

when on it the Haycock is in one with the house on the cliff near Ahungalle Point. Gindavanna Isle kept open of Myimba Rocks clears Alut Rock on the outside."

Point Cocacheira.

POINT COCACHEIRA, called by Mr. Twynam Muta Amarata Boka Point, bears from Berberyn Island about S. by E. $\frac{3}{4}$ E., distant $4\frac{1}{2}$ or 5 leagues; the coast between them is generally of moderate height, and should not be approached under 20 fathoms by large ships, except about 2 or 3 miles to the southward of Berberyn Island: there is said to be good anchorage in 12 or 13 fathoms black sand, near the entrance of a small river. The depths along this part of the coast are not always regular; there are 20 or 22 fathoms about 2 miles off shore, and 60 or 65 fathoms from 3 to 4 leagues off, nearly on the edge of soundings. With the Haycock, a remarkable hill 5 leagues inland, bearing about East, there is a rocky bank, with 30 and 32 fathoms on it, and 37 or 38 fathoms inside, between it and the land.*

According to Mr. Twynam, there are two rocks above water, called the MYIMBA ROCKS, lying a quarter of a mile off Point Cocacheira; they are surrounded by a reef, and have five fathoms close to all round.

A quarter of a mile to the northward of the point, according to the same authority, is the entrance of BALPITTY RIVER, navigable for *dhonies* only, and having a custom-house standing on the north side of the entrance.

Harispol Point.

HARISPOL POINT, three-quarters of a mile to the northward of Balpitty River, is low and sandy, but has several high rocky islets lying close off it, and to the southward several rocks above water, surrounded by a reef, inside of which, off the bar of Balpitty River, is anchorage in 2 fathoms, sandy bottom. Several rocks lie off this part of the coast, from a quarter to three-quarters of a mile off shore, having only 6 feet water on them.

Gindavanna Islet.

GINDAVANNA ISLET is rocky and of moderate height, with several other islets to the northward of it; it bears from Cocacheira Point S. by E. $\frac{3}{4}$ E. 2 miles. Between it and the Myimba Rocks there is a rocky bank about a mile off shore, and having $4\frac{1}{2}$ and 6 fathoms on it. On the summit of a rocky cliff to the S.E. of this rock stands a house, called by Mr. Twynam AMBLANGODDE REST HOUSE; it is conspicuous from seaward, and close to the southward of it there is an opening in the rocks forming a cove, with a sandy beach of about 100 yards in extent, and anchorage in $2\frac{1}{2}$ fathoms water. Several rocks lie off Amblangodde, within half a mile of the shore, and there is anchorage outside of them in 10 fathoms sandy bottom.

Accoral Point.

ACCORAL POINT, in lat. 6° 12′ N., lon. 80° 11′ E., is low and sandy, and covered with coco-nut trees. A little more than half a mile West from it is the Passée Rock, above water, with a bank extending nearly a quarter of a mile to the southward. There is a passage between this rock and the shore, having 10 fathoms in it; but as several rocks lie within half a mile of the shore, having only from 3 to 6 feet water on them, a vessel running through the passage should borrow towards the Passée.

Ragamma Point and adjacent coast.

RAGAMMA POINT, called by Mr. Twynam, Waal Point, distant 3 leagues S.E. by S. from Cocacheira Point, may easily be known by a high rocky islet, called Waal

* This bank seems to be about 5 leagues off shore, extending a considerable distance to the southward. I have twice crossed over in the night, therefore could not ascertain its relative situation.

Islet, which lies about a quarter of a mile directly off it, and other rocks near the shore. There is also a rock, called Debaha Rock, off a low rocky point, called Seeneiganime Point, and bearing N.W. by N. $1\frac{3}{4}$ miles from Ragamma Point, and the Manda Rock lies S.E. $2\frac{1}{4}$ miles from Waal Island, the coast between them forming a bay, with anchorage in 5 to 7 fathoms off the village and river of Dodandoewee, where there is a custom-house.

Hiccodde Rock is small, with 6 feet water on it, and 7 fathoms near it all round; it lies S. S. E. of Waal Island, nearly a mile off shore. Dodandoewee Rocks, which always break, lie W.N.W. of Manda Rock, and Orova Rock about 200 yards to the northward of them; and there are other rocks near the shore to the N.W. of Manda Rock. To avoid these dangers, a vessel coming to the anchorage should keep Debaha Rock well open of Waal Island (which will clear outside Hiccodde Rock), till the north end of a large rocky islet, called Medda Rock, which lies a quarter of a mile North of Manda Rock, is on with the middle of Dodandoewee Modere (river entrance); then haul up for the north bank of the river, giving Dodandoewee Rocks a good berth so as to clear Orava Rock, and anchor with Dodandoewee Rocks bearing from S. S. E. to S.S.W. In passing along this part of the coast, do not come under 20 fathoms, the soundings being very irregular, and the bottom rocky towards the shore.

From Ragamma Point to Point de Galle, the direction of the coast is S. E. by E., and the distance about 3 or $3\frac{1}{2}$ leagues. The shore between them has a level appearance, covered with coco-nut trees, and is dangerous to approach under 20 fathoms, several rocks being situated from 1 to 2 miles in the offing.

GINDURA RIVER is nearly mid-way between Manda Rock and Point de Galle Flagstaff, and may be known by the different character of the coast on each side of it. To the N.W. of the river entrance the coast is low and sandy, while to the S.E. it is rugged and rocky; there is also a high bank of sand, about a quarter of a mile in extent, where the river runs close to and parallel with the coast before breaking through to the northward of a small rocky point; there is a small red cliff on the opposite side of the river. Gindura River.

GINDURA ROCK, called Medda Rock by the natives, is very dangerous, and lies directly off the river 2 miles distant, and bearing W. by N. $\frac{1}{4}$ N., $4\frac{1}{4}$ miles from Point de Galle Flagstaff. There are only 9 feet water on its shoalest part, 4 and 5 fathoms about a cable's length from it all round, and 15 fathoms a quarter of a mile outside of it. There is a clear channel inside, with 7 fathoms near the shore, and 13 and 14 near the rock. A coral point kept open off Waal Island, or Onawatty Point kept open outside the breakers of the Whale Reef, will clear Gindura Rock outside. To pass inside, keep the coral point well shut in by Waal Island. From the shoalest part of the rock, the Haycock will be seen about a sail's breadth to the westward of a small white-topped rock, called the Gull Rock, which lies near the beach, nearly a mile N.W. of Gindura River entrance. Gindura Rock.

THE WHALE ROCK bears W. 4° N., $2\frac{1}{2}$ miles from Point de Galle Flagstaff, and is nearly $1\frac{1}{2}$ miles from the shore; it always breaks, but in fine weather only once in four or five minutes, so that a good look-out is then necessary. There is a channel inside of it, with 7 or 8 fathoms water, rocky bottom, but the soundings are irregular; and there is a bank about half-way between the Whale and the shore, with 4 and $4\frac{1}{2}$ fathoms on it, so that the inside channel should not be taken except in case of necessity. There are 7 fathoms close outside the Whale Rock, 12 a quarter of a mile, and 20 about Whale Rock.

three-quarters of a mile off. The soundings between the Whale and Gindura Rocks deepen gradually from 8 fathoms near both rocks to $15\frac{1}{2}$ fathoms mid-way between them.

Little Whale Rock.

THE LITTLE WHALE ROCK is a small rock above water, lying about half-way between the Whale and Point de Galle Flagstaff, in the same line of bearing. There are many rocks inside of it, with only from 3 to 6 feet water on them. Vessels, therefore, when driven to the necessity of passing inside the Whale, should be careful to haul out between it and the Little Whale, where there is a clear channel with 8 or 9 fathoms, rocky bottom.

Point de Galle.

POINT DE GALLE (the flagstaff) is in lat. 6° 1′ N., by observations taken on shore by Captain Basil Hall, of the Navy, in 1815. I made it in lon. 80° 17′ 42″ E. by chronometers, which placed it 7° $22\frac{1}{2}$′ E. from Bombay Castle; 2° 36′ E. of Cape Comorin; and 2 miles west of Madras Flagstaff, measured by chronometers, when the Flagstaff of Point de Galle was bearing North.

Captain D. Ross, Marine Surveyor, made it in lat. 6° 0′ 59″ N., by observations taken close to the Flagstaff in January, 1824, and in lon. 80° 16′ 50″ E. by chronometers from Bombay. Mr. Goldenham, the astronomer, made it 19″ West of Madras *Observatory*, by chronometer, or in lon. 80° 17′ 2″ E.

The town and fort are built on the point, which is rocky and bluff to seaward, with a rocky islet near it, called Pigeon Island, surrounded by smaller ones. The bay or harbour is formed between the point and the piece of sloping high land to the eastward, which projects farther to seaward than the true point. The entrance of the bay is about a mile wide, the soundings in it from $7\frac{1}{2}$ to $4\frac{1}{2}$ fathoms; but there being many rocks, covered with different depths, from 3 or 4 to 12 and 14 feet water, scattered over the entrance, and also inside, a pilot is requisite to carry a ship into the harbour, where she may moor in 5 or $5\frac{1}{2}$ fathoms abreast the town.

Captain D. Inverarity's excellent survey of this harbour will be found useful as a guide; in it marks are given to avoid the dangerous rocks, thirteen in number within the entrance, exclusive of two outside: the following directions for sailing into Point de Galle Harbour are taken from that survey.

Directions for the harbour, by Captain Inverarity.

"In going in, to the eastward of the 12 and 15 feet outermost shoals, steer along the eastern shore, giving the Bellows Rock, which always breaks, a good berth, keeping the New Belfry open to the northward of the Flagstaff until you open the White Mark, or Painted Rock, with Watering Point, both situated on the eastern shore; then steer for Cook's House at the bottom of the bay, keeping it its own breadth open to the westward of the rocks off the west end of Gibbet Island, until you bring the two Belfries in one; then haul over to the westward, keeping the New Belfry a little open to the northward of the old, and when the south part of Elephant Rock is nearly on with the coco-nut tree on Pigeon Island, or the extreme of Utrecht or Eastern Bastion nearly on with the Flagstaff, you may then haul in to the northward for the anchoring ground, steering direct for Alexander's House, which is rather more than a quarter of a mile to the westward of Cook's House, till in $4\frac{1}{2}$ fathoms; this depth being a good berth for a small ship. This track, between the central and N. Easternmost shoals, is the best for working into the harbour without a pilot, although not used by them.

"Going in by the western track, keep the White Mark well open with Watering Point, and steer to the N. Eastward until the Gull Rock, situated in the N.W. part of the harbour, is open to the westward of a bushy tree, called Pilot's Tree, and the outer-

most Flagstaff Rock, bearing W. $\frac{1}{2}$ S., then steer direct for the westernmost turret of Cook's House, keeping it on, or a little open with the Haycock, carries you fair in between the 2 and 5 feet shoals, also between the 12 and 16 feet shoals, into a good berth for anchoring. This is the best track in the westerly monsoon if the Haycock can be seen, as it is a leading wind into your berth; but it would not be prudent for a stranger to run into the harbour without a pilot, except in possession of the survey mentioned above, and then only in case of necessity."

It is considered a safe place in all seasons of the year, but with strong S.W. winds a ground swell tumbles in. Good water, vegetables, and other articles of refreshment, may be easily obtained. A low sandy beach, with some rocky islets near it, and coco-nut trees behind, form the bottom of the bay, and in the S.E. corner of it, on the north side of the high Rocky Point at the entrance, there is a wharf, and an excellent spring of water at the bottom of a cove, where a small ship may be careened: this bears from the Flagstaff about E. by S. $\frac{1}{2}$ S. a little more than a mile. Supplies.

The outermost rock, off the entrance of the bay, bears from the flagstaff about S. by E. $\frac{3}{4}$ E., distant near three-quarters of a mile; it is called the 15 Feet Rock, has 10 fathoms water close to, all round, and is covered with 15 feet. At a small distance from it nearly North, another rock, covered with 12 feet water, lies in 9 fathoms.

The best anchorage in the road is to the S. Westward of these rocks, in 16 to 18 fathoms soft bottom, with the flagstaff on the point bearing from N.N.E. to N.N.E. $\frac{3}{4}$ E., off the town nearly 2 miles; but when any articles are to be landed, or ships being in want of provisions and water, they will have a more convenient berth, by anchoring in the same depth, with the flagstaff bearing N. $\frac{1}{2}$ E. or N. by E. Out in 20 fathoms the bottom is rocky, where several ships have lost anchors: in 21 fathoms, with the flagstaff N.E. by N., we had our cable cut through by the rocks in 24 hours, and lost the anchor, although the weather was fine, with very little swell. Anchorage in the road.

When the S.W. monsoon blows strong, it is unpleasant to anchor in the road, as Oonawatty Point, sometimes called Bellows Point, or the projecting land on the eastern side, which is steep and rocky, then becomes a lee shore. There are several rocks off this point, on the outermost of which, called the Bellows, the sea breaks very high in bad weather. This rock bears S.S.E. $\frac{3}{4}$ E. from Oonawatty Point, distant a little more than half a mile, and S. E. $\frac{1}{2}$ E. $2\frac{1}{2}$ miles from Point de Galle flagstaff.

When Oonawatty Point bears N.W. 4 or 5 leagues, it may be known by a clump of trees, and if the weather is clear, the flagstaff will be seen about two points open to the westward. To approach the anchorage, the Haycock, a little open to the westward of the flagstaff N. by E. $\frac{1}{2}$ E., is a good leading mark, and with the same bearing, or N.N.E. is the best anchorage in 16 fathoms water, the Western Breakers, W. $\frac{1}{2}$ N., and the Bellows, or Eastern Breakers, E.S.E.

The following directions for sailing into the harbour are by the late Mr. W. C. Gibson, master attendant.

To sail into the harbour, be careful to keep the flagstaff well to the eastward of the *High* Belfry until you open the White Rock, situated on the opposite side of the bay, which will carry you clear of the Twelve Feet Shoal; you may then steer to the eastward, keeping the rock well open, until up with the Four Feet Rock, on which a boat with a flag is stationed. This rock is very small, steep to, and may be rounded close; but should the boat not be there, from the sameness of the land, the only mark to clear it is a remarkable tree on the brink of the hill, in one with the Gull Rock; then a Directions by Mr. Gibson.

north course will carry you clear of the Nine Feet Rock, on which also a boat with a flag is stationed; nor are there many instances of these boats being from their stations, as they always repair to them the moment that the pilot leaves the shore. But I mention this in case of an enemy appearing, when a small vessel might push up the harbour; but I would recommend a large ship to continue her course to the eastward, keeping the White Rock well open, or to steer for it until the *Single* Coco-nut Tree on Gibbet Island bears about North, where she may anchor in 7 or $7\frac{1}{4}$ fathoms, with the point of the watering place bearing about S.E. Here, she will be under the guns of the fort, and although the ground on this side of the harbour is not to be depended on, yet a ship may lie safe until assistance can be procured from the shore.

Mr. Twynam, the present master attendant at Point de Galle, who made a survey of the harbour in 1829, repeats the caution against strangers attempting to enter the harbour without a pilot, unless the boats with flags are at their accustomed stations. In cases of necessity, he gives the following directions, which do not differ materially from those already quoted.

Directions by Mr. Twynam.

"Keep the church well open to the westward of the flagstaff till you bring the White Mark, which is on the eastern shore of the harbour, to the northward of Watering Point; then steer for Gravet Point, the north extreme of the high land forming the east side of the harbour, until Gull Rock is on with Pilot's Tree, bearing about N. by W. $\frac{1}{4}$ W., and the outermost rocky islets off the flagstaff about West; then haul up for the west end of the Cutcherry (a large house on the north side of the bay, the residence of the government agent), which will then bear about N. by E. or a little to the westward of it, keeping it on, or nearly so, with the Haycock, and anchor in $4\frac{1}{2}$ to 5 fathoms with the flagstaff bearing from S.W. to S.W. by W."

Hills and land.

From Point de Galle Road, the Haycock bears nearly N. by E., distant $7\frac{1}{4}$ leagues. This is a high conical mountain, in about lat. 6° $19\frac{1}{2}'$ N.; it is very conspicuous from the offing, in sailing round the south-west part of the island from Colombo to Dondre Head. About 3 leagues eastward from the Haycock there is a table hill, with a knob or hummock on it, which is also visible from the road. The land to the westward is generally low, with coco-nut trees fronting the sea, but to the N. Eastward of Point de Galle it is formed of several ridges of hills, of various aspects.

Bank of soundings.

The bank of soundings extends 3 or 4 leagues' distance to the southward of Point de Galle, on which ships may anchor with a stream or kedge, should the wind fail and the current be unfavourable. In such case, they may anchor in from 20 to 40 fathoms on any part of it, between Point de Galle and Colombo; the bottom is often sand and gravel, but in some places rocky. In coasting along from the former place to the westward, a ship ought not to come under 26 or 28 fathoms during the night, until she approach Caliture, for these depths are sometimes found within 3 or 4 miles of the shore. Between Caliture and Colombo the coast is more safe, and may be approached to 15 or 16 fathoms in the day, but these depths are too close to stand into during the night.

Caution in coasting along shore.

Before October is advanced, strong westerly winds and leeward currents render it sometimes very difficult to get round the S.W. part of Ceylon, from Point de Galle to Colombo. The Company's ship Aurungzebe, August 23rd, 1706, sailed from the former place, stood to lat. 6° S. with westerly winds, then tacked to the N. Westward, and saw the south part of Ceylon again, 25th September; she stood back to 2° S., then tacked and stood to the northward till in lat. 7° 10′ N., without seeing land, being to the eastward of Ceylon; she tacked again to the southward, and got sight of Point de Galle on the 3rd of November, and on the 11th reached Colombo.

# CEYLON, SOUTH COAST, FROM POINT DE GALLE TO ELEPHANT HILL; WITH THE GREAT AND LITTLE BASSES.

*The description of the coast is taken principally from the Remarks of Mr. Twynam, published in the Nautical Magazine for the year* 1836.

THE COAST, from Oonawatty Point, the headland that forms the east side of Point de Galle Harbour, to Bellegam Bay, sometimes called Red Bay, extends E. by S. 4 or 4½ leagues. The land fronting the sea is low and woody, with hills of a moderate height inland, and about 3 leagues to the eastward of Oonawatty Point, near the shore, there is a small island covered with trees, called Woody Island (Yakeeneega Deewa by the natives). This part of the coast is steep, and seldom approached under 30 fathoms. At the west point of Bellegam Bay, we stood within 1½ miles of the shore in the Anna, and then tacked in 26 fathoms. From Point de Galle to Bellegam Bay.

" RASSA MUNA HILL, the west point of Bellegam Bay, bears from Woody Island E. by S. 2 miles; the land between them is rugged, of moderate height, covered with jungle, with an occasional tope of coco-nut trees, and lined with a reef." Rassa Muna Hill.

" BELLEGAM BAY, called also RED BAY, is of considerable depth, and about 1½ miles wide at its entrance; there are two small islands and several rocks above water in the bay, also several rocks having 3 to 4 fathoms on them. The westernmost of the islands lies close to the beach, on the west side of the bay; it is called Gan Island; the other, Pigeon Island, lies more towards the middle and north side of the bay. A reef projects from Rassa Muna Hill upwards of a quarter of a mile to the E.S.E., and extends along the west side of the bay, till within nearly half a mile of Gan Island. Off the inner end of this reef there is a small quoin-shaped rock, called Ruana Rock; on the beach between this and Gan Island is the Custom House and Rest House of Bellegam. Paas Rock, having 3 fathoms on it, lies half a mile E. by S. ¾ S. from Rassa Muna Hill, and Cadda Rock, having 4½ fathoms, one mile in the same direction." Bellegam Bay.

" To come into the bay, keep the high coco-nut trees on the point inside Woody Island well open till you bring Ruana Rock on with Gan Island, when haul up for Varumba Rock, a conical rock elevated about 10 feet above the water, and situated at the bottom of the bay between Gan Island and Pigeon Island; this will lead fair between Paas Rock and Cadda Rock, and anchor to the eastward of Ruana Rock, in 5 to 6 fathoms water, sandy bottom. It is advisable not to stand too far to the northward of Ruana rock, in consequence of some sunken rocks which lie between Gan Island and Pigeon Island. On the east side of the bay lies the village of Mirisse, close to the northward of which are some remarkable red cliffs. There are also Red cliffs at Rassa Muna Hill."

" MIRISSE POINT, the east point of Bellegam Bay, bears from Rassa Muna Hill E. by S. ½ S., 1½ miles. It is the N.W. extreme of a rocky peninsula, presenting a Mirisse Point.

range of cliffs to the sea of about three-quarters of a mile in extent, off the centre of which are several rocks above water."

Madamura Bank.

" MADAMURA BANK, having 3 and 4 fathoms on it, 7 fathoms inside, and 8 close outside, lies about one mile from the entrance of Matura River, and the same distance from the nearest shore; it bears from Pigeon Island S.S.W., rather more than a mile, and from Dondre Head W. $\frac{1}{2}$ N., $2\frac{1}{2}$ miles. This and all other dangers off Matura and Dondre Head may be avoided by keeping the highest part of the high land of Mirisse Point well open of the land to the eastward of it. Three-quarters of a mile to the eastward of Pigeon Island are some remarkable red cliffs, of considerable height, off which there is anchorage in 10 to 20 fathoms sand 1 to 2 miles off shore. There is also anchorage in a small cove close to the eastward of Dondre Head at the village of Kareelewelle, in 3 to 5 fathoms, sandy bottom."

Dondre Head, and adjacent coast.

DONDRE HEAD, the southernmost land of Ceylon, in lat. 5° 55′ N., lon. 80° 40′ E. by chronometers from Point de Galle and Cape Comorin, is a low point of land, with a grove of tall coco-nut trees on its extremity, by which it may be known. A reef of rocks projects from it about $1\frac{1}{2}$ miles to the westward, having 9 and 10 feet water on it, upon which the sea sometimes breaks very high.* To the westward of this, ships may anchor in 20 fathoms, abreast the Red Cliffs, where they will be sheltered from N.E. winds; but directly off the extreme point of Dondre Head there is no ground with 100 fathoms line, within 1 or $1\frac{1}{2}$ miles of the shore, so steep is this headland. Directly North from it about 6 leagues inland, there is a hill, resembling a saddle when seen from the S.E., and the land along this part of the coast is generally of moderate height, formed of a diversity of hills, which become more elevated in the interior.

Gandura Point.

" GANDURA POINT, on the west side of GANDURA BAY, called also GALIES BAY, is of moderate height and rocky; it bears from the east part of Dondre Head N.E. by E. $\frac{3}{4}$ E. $1\frac{1}{4}$ miles; a rock with 3 fathoms lies close to the point on the south side, and about half-way between Gandura Point and Keereelawelle, are some rocky islets, called Hienia Rocks close to the shore. The coast is high and rocky, and lined with a reef. The village of Gandura (Galies) lies to the northward of the point at the bottom of a small cove, about a quarter of a mile in depth and a sixth of a mile wide, having good anchorage in 3 to 6 fathoms, sand and ooze, but exposed to a swell in the S.W. monsoon."

Kapparawelle Point.

" KAPPARAWELLE POINT, on the east side of Gandura Bay, bears from Gandura Point N.E. by E. $\frac{1}{2}$ E. $1\frac{1}{2}$ miles; the coast between them is high and rocky, and lined with a reef, except at the cove and a place called Nourounee, where there is a sandy beach with a plantation of coco-nut trees upwards of half a mile in extent. Kapparawelle Point is high and rocky, and extends in an E.N.E. direction nearly

* It appears to have been on this reef that the Company's ship Euphrates was wrecked, 2nd of January, 1813. She had sailed from Colombo bound to Bengal, and at sun-set 2nd January, Matura bore N.E. by E., Dondre Head, E. by N., off shore about 4 miles; steered E. by S. with a light westerly breeze, going 2 knots, had run 10 or 11 miles from sun-set till 11 P.M., then lost the deep sea lead in sounding, and on heaving the hand lead, found only $9\frac{1}{2}$ fathoms water, at the same time breakers were seen, and the ship twice missing stays, fell upon the rocks and soon filled with water. This ship appears not to have steered sufficiently to the southward, to round Dondre Head; instead of E. by S., a S.E., or S.E. by E. course was more proper from the situation she was in at sun-set, to clear that headland with a light breeze.

half a mile, having several rocky islets off its eastern extremity, called Linea Rocks, inside which, in a sandy bight, is the village of Cotagodde."

"ETALA REEF is nearly half a mile in length; it bears from the east end of Kapparawelle Point E. ½ N. three-quarters of a mile, and is rather more than half a mile from the shore. Half a mile further to the eastward, and half a mile from the shore, is a rock above water, called Bamberee Rock, from which a reef extends to the shore. There are 5 and 6 fathoms inside Etala Reef and between it and Bamberee Rock; 5 to 7 fathoms close outside both, and 7 to the westward of the reef. The west end of Nourounee beach kept open of Kapparawelle Point clears Etala Reef and Bamberee Rock." Etala Reef.

"NILEWELLE POINT, on the west side of Nilewelle Bay, is in lat. 5° 57′ 20″ N., lon. 80° 50′ 20″ E., and bears from Dondre Head E. by N. ½ N. 7¼ miles, and from Kapparawelle Point E. by N. 4½ miles; the coast between being of moderate height, covered with jungle, with occasionally a sandy bight and a plantation of coco-nut trees. Nilewelle Point is rocky, and of moderate height, nearly insulated, being only connected with the main by a strip of sand over which the sea frequently breaks. There is a remarkable tope of coco-nut trees on the point, which gives it the appearance of a table island, when seen from the eastward or the westward, and by which Nilewelle may be known." Nilewelle Point.

"The bay is about a mile in width, its east point (Polonha Point) bearing from Nilewelle Point N.E. ½ E. 1 mile: the land on both sides the bay is high and rocky; at the bottom there is a sandy beach, but lined by a reef, which extends half a mile from the shore. The village of Nilewelle stands in a small bight on the west side of the bay, off which is the best anchorage, in from 4 to 10 fathoms water, sandy bottom; but the bank is steep, and the anchorage confined by the reef above mentioned. Vessels anchoring here should take care to shut Tangalle Fort in by Polonha Point, as outside this mark the ground is foul. One mile to the westward of Nilewelle is the small bay and village of Deekwelle, having a rest house and plantation of coco-nut trees near the beach; but the bay is inaccessible, as the reef which lines the coast from Kapparawelle Point to Nilewelle Point extends across it."

"MAHAWELLE POINT is high, steep, and rocky, it bears from Polonha Point N.E. ¾ N. 1½ miles; the coast between forming a bight, at the bottom of which is a small sandy bay, called Sureya-tree Bay, where the coasting dhonies occasionally anchor in 3 fathoms, sandy bottom, close to the beach; in 4 fathoms the ground is foul. To the northward of Mahawelle Point lies MAHAWELLE BAY,* having anchorage in its south-west part in 4 to 7 fathoms water, sandy bottom; in all the other parts of the bay the ground is foul. E. by N. ¾ N., a quarter of a mile from Mahawelle Point, lie Mahawelle Rocks; they are of small extent, nearly even with the water's edge, having 8 fathoms water close to all round: and three-quarters of a mile from the point, in the same direction, are some rocky islets, called Oonacria Rocks, having a narrow channel inside, with 5 fathoms water, and 7 to 9 fathoms close to on the outside. These islets are nearly half a mile from the shore. The best passage into Mahawelle Bay is between them and Mahawelle Rocks, keeping nearer the latter Mahawelle Point.

* This appears to be the bay called Coenacker Bay in the former editions of the Directory—Coenacker being probably a corruption of Oonacria, the name of the rocky islets near this part of the coast.

to avoid a patch called Middle Rocks, one-eighth of a mile W.S.W. of Oonacria Rocks. The channel is clear near half a mile wide, with 9 and 10 fathoms water. The passage between Mahawelle Rocks and the Point is also clear, with 8 fathoms water, but is much narrower than the other."

Tangalle Point. "TANGALLE POINT, in lat. 6° 1′ N., lon. 80° 55′ E., bears N.E. ½ E. 4¾ miles from Polonha Point; the coast between is of moderate height and rocky, and, except in Sureya-tree and Mahawelle Bays, lined with a coral reef. This is a hilly point, moderately high and gradually sloping to the sea; on its summit stands a square fort very conspicuous from seaward; also the new Cutchery by which Tangalle may be known. The bay, which is of considerable extent East and West, but of no great depth, lies to the eastward of the point; the reef extends from the point half a mile to the eastward. Tangalle Rocks, which are above water and steep to, bear from Tangalle Point E. ½ S. 1 mile; there is a passage between them and the reef, having 5 and 6 fathoms water, but it is not safe for strangers, as the edge of the reef is not always to be seen: and there is a rock called Kadul Rock having only 10 feet water on it nearly in the middle. This rock bears from Tangalle Rocks N.W. ½ N. a quarter of a mile. Another rock, called Maa Rock, having 16 feet water on it, bears from Tangalle Rocks nearly half a mile. On these two rocks boats are usually stationed with flags, when vessels are coming into or going out of the bay. A vessel coming in without these boats, or a pilot, should pass to the eastward of Tangalle Rocks, and stand to the N.E. till Tangalle Kudda Vehare (a small white pagoda, half a mile N.W. of the fort) is in one with the high coco-nut trees on the S.W. bank of Kunkalla Modere: this mark kept on will clear all dangers; then haul up for Kunkalla Modere, and anchor in 5 to 6 fathoms, sandy bottom, Tangalle Rocks bearing S. by E. to S.E. by S. This is the only spot of clear ground in the bay, and is a space about half a mile square; further in, the ground is sand and stones, but a small vessel, having a chain, might in the S.W. monsoon run into 3 or 4 fathoms, where she would be more sheltered by the reef from the heavy swell which sometimes rolls into the bay at that season. To the eastward the ground is very foul. Kunkalla Modere is the mouth of a small river, the Kunkalla, which runs into the west side of the bay a quarter of a mile to the northward of Tangalle Point, and though generally closed by a bank of sand, except after heavy rains, may be distinguished by the gap in the trees. The Custom House is on the west side of the bay, between Kunkalla Modere and the point, and the best landing-place is near it. A reef commences about 1 mile to the N.E. of Tangalle Point, and lines all the eastern side of the bay, projecting in some places nearly half a mile from the shore. The west side of the bay is low, with plantations of coco-nut trees, in which is the town; these extend about 1¾ miles from Tangalle Point, to the eastward of which the coast is higher, sandy, and barren."

Rackova Point. "RACKOVA POINT, the east point of Tangalle Bay, bears from Tangalle Point E. by N. ¾ N. 3⅓ miles. This is a sloping barren point, surrounded by a reef, which projects about half a mile from it."

"Cahandawa Point, a sandy point of moderate height, having a tope of coco-nut trees on it, bears from Rackova Point N.E. by E. ½ E., 2½ miles, the coast between them forming a bight, having on its eastern side some topes of coco-nut trees at the village of Cahandawa. It is lined with a coral reef."

"CAHANDAWA ROCKS are two rocks bearing from each other N.W. by W. and S.E. by E. a quarter of a mile; the inside one, situated on the edge of the reef, is small and above water; it bears from Cahandawa Point S.W. three-quarters of a mile. The outer one is very little below the water's edge, with other rocks round it. It bears from Kahandawa S.S.W. three-quarters of a mile, and from Rackova Point E. by N. $\frac{1}{4}$ N. $2\frac{1}{8}$ miles. There is a passage between these rocks nearest the outer one, having 5 and 6 fathoms rocky bottom, but it is not safe. Close outside these rocks there are 7 and 8 fathoms water." Cahandawa Rocks.

"CALAMATTA POINT is high and rocky, with a chain of rocky islets lying off it; it bears from Cahandawa Point E. by N. $\frac{1}{4}$ N. $2\frac{1}{8}$ miles, the coast between being sandy and barren." Calamatta Point.

"LEVAY ROCK, very little under water, bears from Calamatta Point S.W. $\frac{1}{4}$ S. nearly a mile, and is about half a mile from the shore. The reef runs from this in a line with the coast to the inner Cahandawa Rock to the westward, and to the eastward inclines towards the shore to Calamatta Point. Watta Rock, the outermost of the chain of islets above mentioned, bears from Calamatta Point S.E. half a mile. Some rocks project from its outer part S.E. a quarter of a mile. There is a passage between Watta Rock and the next rocky islet, having 7 and 8 fathoms sandy bottom. A quarter of a mile E. $\frac{1}{2}$ N. of Calamatta Point, and about three-eighths of a mile to the northward of Watta Rock, there is a rocky patch, nearly even with the water's edge, called Calamatta Rocks; between these and the chain of islets there is anchorage in from 5 to 7 fathoms sandy bottom, and between them and the shore to the northward anchorage in 4 to 6 fathoms sand and ooze off the small village of Calamatta. All the ground to the eastward of Calamatta Rocks is very foul: the only landing place is close to the northward of Calamatta Point; a reef lines the coast of all the other parts of the bay, which projects from its eastern side three-eighths of a mile. Dhonies call here for salt." Levay Rock.

"OULANDHE POINT, the east point of Calamatta Bay, is high, sandy, and barren; it bears from Calamatta Point E. by N. $\frac{1}{2}$ N. $2\frac{1}{2}$ miles, and from Watta Rock N.E. by E. $\frac{3}{4}$ E. $2\frac{1}{4}$ miles. E.N.E. three-quarters of a mile from Oulandhe Point are some reddish cliffs, of moderate height, called Rattana Point. Some rocks above water lie close off these points inside the reef, which here projects a quarter of a mile from the shore." Oulandhe Point.

"GODAWOY POINT is high, rocky, and barren, and bears from Rattana Point E. by N. $\frac{1}{2}$ N. 4 miles; the coast between is low and barren, except about half-way, where there are some topes of coco-nut-trees, at the mouth of the river Waluwe, and lined with a reef." Godawoy Point.

"IBHAA ROCK is very dangerous, being very little under water; it bears from Hambantotte Tower W. 21° S. $4\frac{1}{2}$ miles, and from Godawoy Point, the nearest land, S.S.E. $\frac{1}{2}$ E. three-quarters of a mile. There is a clear passage inside the rock, with 6 and 7 fathoms water near the shore, and 8 and 9 near the rock, irregular rocky bottom; between Nehinde and Ibhaa Rocks there are 9 and 10 fathoms, and close outside both 10 fathoms. From the form of the land no good marks can be given to clear these rocks; a ship should not, therefore, come under 15 fathoms water in the night, when Ibhaa Rock.

near them; nor even in the day unless the rocks are seen, which, as they generally break, they will probably be until Hambantotte tower bears about N.E. by N. or N.N.E.; this depth will be about three-quarters of a mile outside the rocks; there are 20 fathoms in about 1¾ to 2 miles outside of them."

Waluwe River and adjacent coast.

WALUWE RIVER bears about E. by N. ½ N. 4 leagues from Tangalle; the coast between them is low and barren close to the sea, but high inland, and may be approached to 25 fathoms within 4 or 5 miles of the shore. Off the entrance of Waluwe River, at the distance of 3 or 4 miles, there is a rock* on which the sea generally breaks, said to have a channel, with 7 and 8 fathoms sandy bottom between it and the shore, through which small vessels may occasionally pass; a little inland from the entrance of the river stands a small mountain of barren aspect.

Nehinde Rock.

"NEHINDE ROCK is very dangerous, being nearly level with the water's edge, and steep all round; it bears from Hambantotte Tower S.W. by W. ¼ W. 3¼ miles, and is a mile from the nearest shore. There is a clear channel inside it, having in it 5 fathoms near the shore, and 8 or 9 close to the rock."

Hambantotte Point.

"HAMBANTOTTE POINT, in lat. 6° 7′ N., lon. 81° 15′ E., is high, sandy, and barren. It bears from Godawoy Point E. by N. 5 miles; on its summit stands a round tower, and several houses, among which are the residences of the commandant and the assistant government agent of the station. To the north-eastward of the point is the small BAY OF HAMBANTOTTE, with anchorage in it from 4 to 6 and 7 fathoms, sand and ooze. To the eastward of the point there is also anchorage in 8 or 10 fathoms, sand. The town is at the bottom of the bay near the point. This is the principal place of export for salt, and vessels calling here for that article should, in the N.E. monsoon, anchor to the eastward of the point; but in the S.W. monsoon they should run farther into the bay, so as to be in some measure under the lee of the point, where they will be less exposed to the swell, and where the boats can pass to and fro with greater facility. All dangers are visible."

Levoy Point.

"LEVOY POINT, the N.E. point of Hambantotte Bay, bears from Hambantotte Point N.E. ½ N. 1⅛ miles."

Patterajah Point.

"PATTERAJAH POINT is of moderate height, sandy and barren; it bears from Hambantotte N.E. by E. ¾ E. 6½ miles, the coast between being sandy and barren and lined with a reef."

Dorava Point.

"DORAVA POINT, called also MAGO POINT, a flat rocky point of moderate height, bears from Hambantotte E.N.E. about 12 miles, and from Patterajah Point E. by N. ¾ N. 6 miles, the coast between being moderately high, sandy and barren. About 1¼ miles to the westward is the mouth of the small river Kirinde, near the village of Mahagam; this river is shut by a rocky bar."

Lanceeya Rock.

"LANCEEYA ROCK, a small rock above water, bears from Dorava Point South half a mile. The reef extends from this to the shore."

Dorava Rock.

"DORAVA ROCK, having on it 3 fathoms water, with 10 and 11 all round, bears

* Mr. Twynam thinks it probable that this rock is the Nehinde Rock, hereafter described.

from Dorava Point S.E. three-quarters of a mile, and from Lanceeya Rock East half a mile. This may be avoided by not coming under 13 fathoms till the highest peak of the Katteragamme Hills (a ridge of undulating hills nearer the sea than any other high land) is in one with Kirinde Point."

"KIRINDE POINT bears from Dorava Point N. E. ½ N. one mile: this is a rugged, rocky point, of moderate height, having several large rocks on its summit, one higher than the rest; near which, on a mound of earth (the ruins of some old building), a temporary flagstaff is sometimes erected. There are the remains of an old tank close to this, which still contains good water. Several detached rocks lie off this point. This is a place of export for salt, but it is uninhabited, except by the people employed by government in the shipping of salt, and who are sent from other stations when required. The salt stores are on the beach at the bottom of the small bay to the northward of the point, off which, dhonies and small craft anchor in 3 to 3½ fathoms water; but a patch of sunken rocks and a rock with 7 feet water on it lie in the passage, rendering this anchorage difficult of access. The best anchorage is in 9 to 10 fathoms water, with the north end of the salt stores open of the high part of the point, but not so far out as to be on with the outer detached rocks;—the high rock on the summit of the point above mentioned will then bear W.N.W. to N.W., and the outer detached rock from N.W. to N. ½ W.; to the north-eastward of this the ground is foul." Kirinde Point.

"PALOOTOPANE POINT is low and sandy, and bears from Dorava Point N.E. by E. 5 miles, the coast between them being barren and sandy, and, except Kirinde above described, lined with a reef. About half a mile to the N.N.E. of Palootopane Point, on the summit of the rising ground near the beach, where the coast forms a sort of bight, stands Palootopane Fort. The Great Basses bear from Kirinde E. by S. 9 miles, the channel between them being clear of danger, with from 10 to 18 or 20 fathoms water in it." Palootopane Point.

MATURA, in lat. 5° 58′ N., about lon. 80° 37′ E., bears about E. ½ S. from Mirisse Point, distant 8 miles; the land between them is moderately elevated, and the coast very steep, having 60 fathoms water in some places within 2 miles of the shore. Matura.

Matura is a considerable town with a fort, the station of an assistant government agent. It is conspicuous from seaward, when it bears between N.N.W. and N.E.:* ships may anchor here in the N.E. monsoon abreast the town in 20 and 22 fathoms, sand, shells, and ooze, off shore about 2 miles; under 20 fathoms, the bottom is generall foul. Plenty of wood and good water may be procured in the river, the entrance of which is about half a mile to the westward of the fort; boats going into it to fill water should have some of the natives as pilots, to guide them clear of the dangerous sunken rocks at the entrance, on which they might be liable to strike and overset by the strong outset. Supplies.

Matura Island, called also Pigeon Island, opposite the fort, and near the shore, is small and rocky, resembling a haycock; boats find shelter under it, and the surf being generally high on the shore, canoes are used for passing to the main.

The coast from Matura to Dondre Head stretches S.E. by E. to S.E. by S. about

* Mr. Twynam describes it as "not easily discerned from seaward," but that "its position may be known by Pigeon Island, a round island resembling a haycock, which lies directly off it near the beach."

4 miles, and is remarkable on account of some red cliffs about half-way between them, resembling those at Red Bay, only they are more conspicuous.

Elephant Hill.

ELEPHANT HILL bears from Dorava Point nearly N.E. by E., distant about 5 leagues; it is very remarkable, being a high isolated rock on the low land close to the sea. The coast from Dorava Point to Elephant Hill is rather low, barren and sandy near the sea, and may be approached in day-light to 24 or 25 fathoms, but not under 30 or 32 fathoms in the night, particularly in the vicinity of the Great Basses.

Great Basses.

THE GREAT BASSES, called RAMANPAAJ by the natives of Hindoostan, is the name of a ledge of rocks nearly a mile in extent, elevated a few feet above water, on which the sea breaks very high in bad weather. According to the natives, there stood on it formerly a Pagoda, made of brass, but at present nothing appears but a long flat rock, and when the sea runs high, the surge at times completely covers it. This dangerous ledge is about 3 leagues distant from the shore, and is on with Elephant Hill bearing N. ½ W. By good observations, taken very close to it in passing two different times, I made it in lat. 6° 11′ N.* and in lon. 81° 36′ E., or 1° 18½′ E. from Point de Galle by three chronometers agreeing. Captain P. Heywood, of his Majesty's ship Dedaigneuse, made it 1° 19′ E. from Point de Galle by chronometers, and in lon. 81° 40′ E. by lunar observations. There is a safe channel between it and the main, having sandy bottom 12 and 14 fathoms near the Basses, and 7 or 8 fathoms towards the shore. Close to the rock on the outside there are 21 and 22 fathoms, about half a mile from it 24 fathoms, 34 fathoms at 2 or 2¼ miles' distance, 45 and 50 fathoms about 2 or 2½ leagues off, from whence the bank shelves suddenly to no ground.

Inner Channel.

THE CHANNEL WITHIN THE GREAT BASSES may be used occasionally with day-light, but not without great caution, and by borrowing towards the Great Basses, because the straggling dangers with which the Little Basses are surrounded to a considerable distance on every side extend from them in a direct line about half-way to the Great Basses; and as this Rocky Bank has overfalls on it from 12 to 7 and 4 fathoms coral rocks, and there probably may be less water in some parts, it ought to be avoided.

The Ship Agnus, Captain William Richardson, passed inside the Great Basses, 3rd March, 1809; had one cast of 9 fathoms off Mago Point, where the rocks project some distance from the shore: steered then about N.E., deepening quickly into 14, 15, 16, and 17 fathoms, and anchored in the evening in 12 fathoms with the Great Basses bearing S. 36° E., Elephant Hill N. 13° E., and Mago Point S. 64° W. Weighed at midnight with the land wind, steered N.E. by E. and E.N.E. in irregular soundings, decreasing from 12 to 8 fathoms, and deepening again by steering a little more out; towards day-light, steering out East, deepened to 17 fathoms, and shoaled again to 12 fathoms upon the Rocky Bank, between the Great and Little Basses.

The whole of the coast from Elephant Hill, to a considerable distance to the northward of Chimney Hill, has a steep sandy beach, with a few rocks projecting a short distance into the sea in some places.

* At noon the observed latitude was 6° 10½′ N. upon the Basses, by some officers who landed there from one of his Majesty's ships, and found it consisted of two ledges of dry rocks, united by shelves under water, the largest steep ledge being the outermost.

THE LITTLE BASSES, in lat. 6° 24½'* N., lon. 81° 54' E., bear from the Great Basses N.E. ½ E., distant 7 leagues, and consist of a ledge of rocks a little above water, with others contiguous, projecting under water to a considerable distance, particularly in a N.N. Easterly direction; straggling rocks extend a great way from the dry ledge; the rocky ledge above water, being low, is not perceived unless a ship pass near, but the breakers on it may always be discerned. It is distant from the shore 6 or 7 miles, bearing about S.S.E. from a sandy point of land called Julius Nave, which is not discernible on this bearing; from the Elephant Hill this dangerous ledge bears about E. by N., and is in one with Chimney Hill, bearing N.W. ½ W. This is a pretty high hill near the sea, having on its declivity, not far from the summit, a conspicuous rock resembling a chimney. A little farther inland to the N.W. is Pagoda Hill, taking its name from a large rock near its summit, resembling a pagoda or castle, which is a much larger rock than that on Chimney Hill. These hills are in one bearing N.W. ½ N.; when Chimney Hill bears N.W. it is then touching the north part of Pagoda Hill. Near these, other hills are situated, and the land is mountainous farther in the country, but in clear weather Chimney Hill will easily be distinguished with the telescope, and answer as a guide to point out when a ship is approaching, or opposite to the Little Basses. *Little Basses. Adjacent coast and hills.*

Close to the rocks there is on the outside 18 and 19 fathoms, about 2 miles from them 28 or 30 fathoms, and 2 or 2½ leagues from them 45 and 50 fathoms; but no ship ought to approach them nearer than 2 miles. *Soundings.*

THE CHANNEL INSIDE THE LITTLE BASSES is not safe for large ships, there being about mid-way, in a direct line between them and Julius Nave Point, 2½ and 3 fathoms rocks, where the French ship Resolution struck, and where his Majesty's ship Dædalus was wrecked. If a ship pass through in a case of necessity, she ought to keep near the main, within one mile of Julius Nave Point, in 6 and 7 fathoms; the depths are nearly the same in mid-channel, close to the rocky patches which extend from hence to the Little Basses, rendering the passage dangerous, except close to the main. *Inside channel.*

Captain W. Richardson observes, that having occasion to pass inside the Little Basses, he found the channel safe by keeping close along shore, in 5½ to 6 and 7 fathoms regular soundings; but a ship ought not to approach near to the S.W. part of the Little Basses in coming from seaward, for a reef is thought to extend in that direction to a considerable distance. Steering in, shoaled from 20, quickly to 12, 8, and one cast of only 4 fathoms coral rocks, then deepened over towards the shore to 7, 8, 10, and 12 fathoms fine sand, the Little Basses just in sight from the deck bearing N.E. by E., and Elephant Hill W. 2° S. Also a little farther to the southward, nearly in the same direction from the Little Basses, in sight from the mast-head, had 6 fathoms, with Elephant Hill bearing W. ½ N.

THE COURSE FROM DONDRE HEAD to the Great Basses is about E. by N. ½ N., distance 19½ or 20 leagues; but the *prudent* navigator ought not to place much confidence in the distance run by the log, during the night, for the currents are frequently strong, and their direction uncertain. In the S.W. monsoon, when the wind blows strong along the south coast of Ceylon, the current runs with it to the eastward; a ship passing then from Dondre Head will be sooner abreast of the Great Basses *Sailing directions. Current.*

* An officer of his Majesty's Navy places them about 3 miles farther North.

than expected. In a run of 24 hours from Point de Galle, in June, 1794, the log gave only 46 miles from thence to the eastern part of the island, whereas the true difference of meridians between these places is about 1° 47′ E. These strong easterly currents are not constant, particularly in the vicinity of the Great and Little Basses; for there, and along the east side of the island, the current frequently sets to the southward in the S.W. monsoon, and almost constantly so, during the other monsoon.

If a ship, in settled weather, in the day-time, adopt the inside channel, she ought to proceed as the direction of the wind may render necessary, borrowing towards the Basses to 12 or 14 fathoms, and to 8 or 9 fathoms near the main. The Rocky Bank, with from 9 to 4 fathoms on it, about mid-way, in a direct line between the Great and Little Basses, and probably joining the latter, may be avoided by keeping within 1, 2, or 3 miles of the Great Basses; for as Captain Richardson had only 4 fathoms on one of the rocky patches of this bank, no large ships should venture to cross over it, as there may be even less than 4 fathoms on some spots.

Some ships, after passing Dondre Head, steer in the night East and E. by S. in the S.W. monsoon, to give the Basses a good berth, which carries them so far off the land, that they are obliged to haul to the N.W. at day-light, close to the wind, on purpose to regain it; and the whole of the following day is sometimes spent, before they are enabled to approach the coast about the eastern part of the island.

Other ships steer a course inclining towards the shore, and are thereby liable to run into great danger during the night; some have narrowly escaped destruction, whilst others have been wrecked, as will be shown by the following extracts from their journals.

Instances of ships in danger near the Basses.

His Majesty's frigate La Virginie was nearly lost, by getting unexpectedly between the Basses and the shore in the night.

His Majesty's ship Phaeton, and the Sir Edward Hughes in company, made the Island of Ceylon in the evening, 23rd May, 1804. Steering N.E. and N.E. by E., at 9 P.M. they sounded, and had 10 fathoms rocks; hauled out S.E., and deepened to 15, 18, and shortly after no ground at 30 fathoms; steered then E. S. E., E. by N., and N.N.E., and at half-past 5 A.M. saw the breakers on the Little Basses bearing W. $\frac{1}{4}$ S., had then ground 17 and 21 fathoms, hauled out East, and soon had no ground 25 and 35 fathoms. These ships appear to have passed inside the Great Basses without seeing that danger, and must have been close to the rocks of the Little Basses when in 17 fathoms at half-past 5 A.M.

The Ceres, with the fleet in company, bound to Madras and China, in 1798, made the Island Ceylon before sun-set. The course steered after dark carried them too close to the land, and it appears they did not sound, for about 1 A.M. the breakers on the Great Basses were seen from the Lord Nelson, very near on the starboard side, the fleet being inside of them.

The signal of danger was then made; finding they were in shoal water, and their cables not bent, they hauled out to the eastward between the Great and Little Basses, having passed inside of the former unexpectedly.

The Contractor, from England, bound to Madras, was abreast of Dondre Head, 1st August, 1792; at noon the observed lat. 5° 45′ N., lon. 80° 44′ E. by chronometer from observation ☉☾, the extremes of the island then bearing from N.W. $\frac{1}{2}$ W., to N. E. $\frac{1}{2}$ E., having experienced an easterly current of 45 miles during the preceding 24 hours. Aug. 2nd: from noon yesterday steered along shore, and at sun-set the extremes of the land bore from S.W. by W., to N.E. by N.; from this time steered E. by N. and

E.N.E. 19 miles, and N.E. 6 miles till 9 P.M., had then 17 fathoms soft ground several casts; stood off E.N.E. 6 miles till 10 P.M., with *an intent* to give the Great Basses a *good berth*, but about 10 P.M. saw breakers close aboard on the starboard bow, hauled up instantly to the northward, and thereby avoided destruction; shortly after saw the main, and thinking it imprudent to run between it and the rocks in the night, anchored in 16 fathoms soft ground, the breakers bearing S.E. about 1½ miles. At day-light, sent the boat to the E.N.E. to examine the passage, where even bottom was found from 20 to 13 fathoms 5 or 6 miles to E.N. Eastward. At 8 A.M. weighed with some difficulty, the ground being stiff mud, and followed the boat; passed the breakers on the inside, distant about a mile, and then hauled out to the eastward.

The ship Soliman Shah, of Surat, got close to the Little Basses in the night, and anchored; at day-light, found she was close to the rocks, and they were obliged to cut the cable, to cast her clear of the danger.

Dædalus lost inside the Little Basses.

His Majesty's ship Dædalus was unfortunately lost on the rocks, about mid-way between the Little Basses and the main, 2nd July, 1813, and several of the 1,200 tons ships under her convoy, bound to Madras and China, were nearly sharing the same fate, as will be seen by the following extracts from their journals. The dry haze, which prevails greatly about this part of Ceylon, deceived them in their distance off the land, thinking themselves farther from it than they really were; and without great caution strangers are very liable to make this mistake.

The Rose, 2nd July, 1813: at sun-set Dondre Head bore N.N.E. ¾ E., distant 4½ miles; steered East 11 miles, E. by N. 55 miles, and E.N.E. 13 miles, till 6 A.M.; hauled up North 7 miles, and at 7 A.M. saw the land bearing North, distant 10 or 12 miles; hazy weather. Steered N.N.E. 7 miles till 8 A.M., then saw the Little Basses on the starboard quarter, bearing S.E. about 3 miles; had 7, and a quarter less 7 fathoms, hauled out E.N.E. and deepened; Chimney Hill bearing N.W. At 9 A.M., when in 35 fathoms hove to, and sent our boats to the Dædalus, aground on the rocks between the Little Basses and the main.

Dangerous situation of other ships.

The Atlas, Captain Mayne, 2nd July, 1813, during the night, kept considerably outside the fleet, thinking the course steered would carry us too near the Great Basses. At day-light, body of the fleet 5 miles to the northward of us, hauled up by a signal made to steer North; but judging the fleet were bearing too much on the Little Basses, some of the ships then 2 miles to the west of us, and the weather being hazy, we only steered N.N.E. ½ E. At a quarter past 8 felt the ship graze on rocks, hauled out East, grazed a second time, hauled out S.E., and saw the breakers on the Little Basses bearing N.N.W. ½ W., distant 1½ miles; had soundings 3¼, 5, 7, 10, then 20 fathoms. Observed the Dædalus aground on a shoal, between which and the Little Basses the whole of the fleet hauled out. After joining the fleet to the N. Eastward of the Little Basses, hove to, and sent all the boats to the assistance of the frigate, with carpenters; but after every exertion to save her, at 6 P.M. she heeled over on the larboard side and went down.

It was fortunate that the Atlas, a new and valuable ship, was not wrecked on these sharp straggling rocks which surround the Little Basses; she was the only ship that passed outside of them. Some of the other ships also grazed on the rocks inside, one of which was the Bridgewater, close on the starboard quarter of the Dædalus, when the latter grounded; and as this was immediately observed by Captain Hughes, he hauled, and grazed on the rocks twice, but fortunately passed over them, by which this new ship of 1,200 tons was also saved from destruction.

Hannahjee lost on the Little Basses.

Ship Hannahjee, Captain Henderson, September, 1809, was wrecked on the Little Basses. Working to the southward, in standing towards the land, perceived between 7 and 8 P.M. that we were close to the Little Basses; the helm was immediately put down, but the ship refused stays and fell upon the rocks.

January 27th, 1821, the Earl Moira, Captain Hornblow, having had dark cloudy weather, and judging they were 10 leagues off the land, struck on the rocks inside the Little Basses at 10 P.M., and lost the rudder. After getting off these rocks she struck on another patch, and drove clear of those also, then anchored in 6 fathoms, when the current was found to set W.S.W. about 4 miles per hour.

Steering along in 34 fathoms in the Anna, 24th March, 1801, the breakers and part of the Black Rock of the Great Basses were plainly seen in the night with the telescope for a considerable time in passing, and appeared to be distant about 2 miles; but neither could be discerned without the telescope.

The foregoing extracts from original journals have been given to warn navigators, when passing round these dangers, and the south-eastern part of Ceylon, in the night or in thick weather, where the currents are frequently very strong, and *capricious* in their direction.

To pass the Basses in the night.

To avoid such disasters, a ship being abreast of Dondre Head, at 2, 3, or 4 leagues' distance in the S.W. monsoon, ought to steer about E. by N. or E. by N. ½ N., according to the distance from the land, taking care to sound in time, if it be night. Although the coast near Dondre Head is steep, with deep water near the shore, about 10 leagues to the eastward, soundings extend farther out, and from thence to the Great Basses are pretty regular; the bottom sandy, often mixed with mud. From the Great Basses to the distance of 8 or 10 leagues to the westward, the depth is usually from 26 to 30 fathoms about 2 or 3 leagues off shore, towards the Basses; and the same depth about 3, 4, and 5 miles off shore, farther to the westward. Where the depth is more than 40 fathoms, the bank in general shelves quickly to no ground.

Having run in the night 8 or 10 leagues to the eastward of Dondre Head, the lead should be attended to as the best guide, keeping under moderate sail if the wind is brisk, that good soundings may be obtained by heaving to, or otherwise. Having got soundings, a ship should not come under 34 or 36 fathoms, in steering a course parallel to the coast, and should keep the lead going, particularly when approaching the meridian of the Great Basses; then haul out a little on the edge of soundings if the night be dark, or the weather unfavourable; but if the night be clear, with settled weather, she may keep in soundings between 34 and 40 fathoms, taking care not to come under 34 fathoms; she will then pass outside the Basses about 2 miles' distance, which is as near as can be done with prudence in the night. In day-light, with a steady breeze, a ship may borrow towards them to 24 or 25 fathoms, she will then be distant from them about half a mile.

Having passed the Great Basses in the night, a course may be steered about N.E. by E. to pass the Little Basses, which are distant 7 leagues from the former, attending particularly to the lead, and not coming under 34 or 35 fathoms until certain of being to the N. Eastward of this danger, or until day-light appears.

Coming from the northward in the night, with the wind fair, or from the land, the same method may be adopted, keeping on the edge of the bank of soundings, taking care, in passing these dangers, not to come nearer than 34 or 35 fathoms; and as a ship may sometimes be greatly retarded or accelerated in her progress by uncertain currents, it will be prudent not to borrow under 34 or 35 fathoms in the night, on any part of the south-east coast of Ceylon; more particularly as they sometimes

set towards the shore about the Basses, but generally to the southward or south-eastward.

*General Remarks on the South-west and South Coast of Ceylon, by Mr. Twynam.*

"The coast from Bentotte to Dondre Head presents a succession of sandy bights covered with coco-nut trees with intervening rocky points or cliffs; the land near the sea is generally low, but increasing in height inland in ridges of irregular hills; the most conspicuous of these is the Haycock, a conical mountain, in lat. 6° 20′ 30″ N., lon. 80° 25′ 15″ E. From Dondre Head to Tangalle, the coast assumes a more rugged, rocky appearance, the plantations of coco-nut trees are fewer and of less extent. To the eastward of Tangalle the coast is sandy and barren; a few topes of coco-nut trees are to be seen between Tangalle and the Waluwe River, but to the eastward of the latter none. The hills fall farther back as you advance to the eastward, leaving a level space between them and the sandy hillocks near the sea, in which are the salt levoys and marshy grounds called Kaloopous.

"The bank of soundings gradually extends farther from the shore as you increase the distance from Dondre Head: off Bentotte, at a distance of 3 miles there are 20 fathoms, at 4½ miles 30 fathoms. At 1¼ miles off Accoral there are 20 fathoms, and 30 at 2½ miles. Off Galle the soundings are more irregular. From the vicinity of Gindua and Whale Rocks, at 1¼ miles off shore, are 20 fathoms, while at a distance of 2½ miles, or half a mile outside these rocks, there is a depth of 30 fathoms. Off Balligam, at 1⅛ miles' distance, are 20 fathoms, and 30 at 1¾ miles. Three-quarters of a mile off Dondre Head there are 20 fathoms, 30 at 1¼ miles, and 50 at 2 miles' distance. Three miles off Tangalle there are 20 fathoms, and 30 at 3½ to 4 miles. Off Hambantotte, at 3½ miles' distance, are found 20 fathoms, and 30 at 5 miles from the shore. From 30 fathoms the water deepens less rapidly, 40 fathoms being the depth at 2 and 3 leagues from the land, except in the vicinity of Dondre Head. To the westward of Dondre Head, 20 fathoms will carry clear of all dangers; but it would not be prudent to approach the shore so close in the night, when in the vicinity of some of the dangerous rocks described above. To the Eastward of Dondre Head, as far as the Great Basses, 15 to 20 fathoms will clear all dangers. To pass outside these rocks in the night, a ship should haul out when approaching them into 30 or 40 fathoms water. In fine weather, when the land can be distinctly seen, a ship may pass inside the Great Basses in the night, keeping about 2 or 3 miles from the shore; but care must be taken not to approach the Little Basses during the night, after passing inside the Great Basses."

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## EASTERN COAST OF CEYLON, FROM ELEPHANT HILL TO TRINCOMALEE; WITH SAILING DIRECTIONS.

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THE COAST OF CEYLON, from Elephant Hill, extends about N.E. by E., 5 or 5½ leagues, to the high sandy point of Julius Nave,* being low, barren, and sandy, From Elephant Hill to Julius Nave;

* This point is not easily distinguished from the offing.

fronting the sea; but this part is seldom approached, as few ships pass inside the Great Basses, unless by accident, or in a case of necessity.

A large ship ought not to pass between the Little Basses and the shore, on account of the rocks in that channel, already mentioned in the description of those dangers.

Julius Nave to Magame.

From Julius Nave Point, the coast lies N.E. by N. $\frac{1}{4}$ N. about 5 leagues, to another small projection called Magame, which bears from the Little Basses about N. by E. $\frac{1}{4}$ E. $5\frac{1}{2}$ or 6 leagues, and is said to have shoal water extending from it to a considerable distance. This part of the coast is also low and sandy facing the sea, with Chimney Hill, Pagoda Hill, and others, a little inland to the westward, already described in the preceding section. The soundings on the bank stretching along this part of the coast are generally regular, and give sufficient warning when it is approached in the night; the depths are 17 and 20 fathoms from $1\frac{1}{2}$ to $2\frac{1}{2}$ leagues off, and between 40 and 50 fathoms near the edge of the bank from 4 to 5 leagues off shore.

Aganis.

AGANIS, or AGAUS, in about lat. 6° 50′ to 7° N., a space of land with some hillocks near the sea, is the easternmost part of the Island Ceylon, and situated about 6 miles East of the meridian of the Little Basses; being 1° 41′ E. from Point de Galle Flagstaff by chronometers, and in lon. 81° $58\frac{1}{2}$′ E. by mean of many lunar observations taken by me at various times.

Between the hilly land of Aganis, and the hills to the N. Westward of the Little Basses, there is a considerable space of low land, excepting an isolated mount on it, which has a regular peaked appearance when viewed from eastward, but resembles a saddle, having a gap in it when seen from the southward.

From the Little Basses to the land of Aganis, the courses are N.N.E. $\frac{1}{2}$ E. and N.N.E., and the distance 10 leagues; between them, the coast may be approached with safety to 17 or 18 fathoms, about $1\frac{1}{2}$ leagues off shore, the depths on the bank being pretty regular, generally sandy bottom; and the edge of it, where there are 45 and 50 fathoms, is distant $4\frac{1}{2}$ or 5 leagues from the shore.

At a considerable distance inland from Aganis, in about lat. 7° N., there is a table mount, called Westminster Abbey, with a large square knob or turret on its north end, and there is a peaked hill near the sea, generally called Aganis Peak; these are in one with each other, bearing W. by S.

The general outline of the S.E. coast of Ceylon is convex towards the sea, rounding gradually without any conspicuous headlands. Between lat. 6° 30′ and 7° N. is an advisable place to make the land, for ships running toward the eastern part of the island in the N.E. monsoon, taking care in the night, to fall in with it to the northward of the Little Basses.

Baticolo, coast from Aganis.

The coast between Aganis and Baticolo River, in lat. 7° 44′ N., is generally very low near the sea, interspered with plantations of coco-nut trees, and some houses or small villages. In this space, a ship may generally borrow to 19 or 20 fathoms, these depths being from $2\frac{1}{2}$ to 3 or 4 miles off shore, and the bank of soundings extend from it to the distance of $2\frac{1}{2}$ or 3 leagues, where the depths are from 45 to 70 fathoms, but not always regular: for in a few places, within 4 miles of the shore, there are 35 and 38 fathoms. In working during the day, a ship may in some parts venture into 15 or 16 fathoms, and tack within 2 miles of the shore; but 20 or 22 fathoms is as near as it should be approached in the night; for in these depths, if the moon shines bright, the surf will be seen breaking on the sandy beach, or the noise of it may sometimes be heard with the land wind. From some of the small projecting points, foul ground is

said to extend about 1 or $1\frac{1}{2}$ miles, rendering it prudent not to come under 20 or 22 fathoms near them, particularly in the night.

Nearly abreast of the Friar's Hood Mountain, but rather to the southward, is the entrance of a river, which extends a great way inland, having to the southward a pagoda, among a grove of coco-nut trees, at a place called Tricoll.

Friar's Hood and other hills.

The coast contiguous to Baticolo is low, but several mountains or hills inland are conspicuous in sailing along this part of the island. The most remarkable and highest of these is the FRIAR'S HOOD, in lat. 7° $29\frac{1}{2}$′* N., lon. 81° 36′ E., according to Mr. Goldenham, the astronomer, who measured the meridian distance from Madras, by chronometers. It is $4\frac{1}{2}$ or 5 leagues from the sea, and leaning over to the left, resembles a Friar's Hood when bearing to the S. Westward, but has the form of a pyramid when it bears to the N. Westward. To the southward of it there is another mountain, somewhat similar in appearance, called the False Hood, which is not so high as the former. Far inland, about 7 leagues to the westward of the Friar's Hood, there is a round conical hill, called the Kettle Bottom, visible in clear weather; and on the middle of the great level plain, in lat. 7° 49′ N., about 6 leagues W. by N. from the entrance of Baticolo River, is a sharp isolated cone, called the Sugar Loaf.

Baticolo River.

BATICOLO RIVER, in lat. 7° 44′ N., lon. 81° 50′ E., by chronometers, is narrow at the entrance, not discernible except from the northward, the opening being in that direction; but it may be known by a house and flagstaff, where the colours are usually shown to passing ships. There is 6 feet on the bar at low water, and the tide rises about 2 or 3 feet perpendicularly; high water at 4 hours on full and change of moon, but not always regular.

The fort is 4 or 5 miles up the river, on an island, where water may be procured from a well; buckets must be taken on shore to draw up the water, and the casks are landed at the wharf, and rolled to the well. Wood may be cut near the bar, on the banks of the river.

Anchorage.

The anchorage in the road is not always safe in the N.E. monsoon, when a gale from that quarter may be liable to happen from September to February, but in the S.W. monsoon it is safe. Ships generally anchor to the N.W. or Westward of the reef, with the entrance of the river about South, the Friar's Hood S.S.W., distant about 2 miles from the river's entrance, abreast of a cluster of rocks projecting from the shore to the northward of the river.

Dangerous Rock.

H.M.S. Terpsichore, at anchor in $8\frac{1}{4}$ fathoms, off shore about $1\frac{3}{4}$ miles, had the Friar's Hood bearing S. 25° W., entrance of Baticolo River S. 24° W., Sugar Loaf N. 80° W., a rock even with the water's edge S. 56° W., northern extremity of land N. 36° W., and the southern extreme S. 39° E. At the distance of $2\frac{1}{2}$ miles E. by S. $\frac{1}{2}$ S. from the ship, a rock was found with 14 feet water on its shoalest part; on the deepest part $3\frac{1}{2}$ fathoms, being about a quarter of a cable's length in extent N.E. and S.W., and 9 fathoms breadth. A little outside of it, there are 9 and 10 fathoms clear ground, and close to, 8 fathoms; on the inside, close to it, from $5\frac{1}{2}$ to $7\frac{1}{2}$ fathoms rocky bottom. By keeping the notch in the grove open, and distant from the shore not less than 2 miles, you will be clear of the danger.

From the rock, the Friar's Hood bore S. 29° W., entrance of the river S. 56° W., Sugar Loaf N. 79° W., the ship N. 74° W., and the notch in the grove just shut in, bearing South.

* It was formerly thought to be in lat. 7° $25\frac{1}{2}$′ N., lon. 81° 44′ E.

Shoal. About a mile S.E. by E. ½ E. from the ship, and rather more than a mile from the shore, 20 feet water was found on a shoal, which joins to a coral bank stretching 3 or 4 miles parallel to the shore, having uneven ground on it from 4 to 7 fathoms.

Marks to avoid the dangers. In coming from the southward, be careful to keep the notch, or two groves of coconut trees open, until the Friar's Hood bear S.S.W., then you may run in with safety, crossing the coral bank in 6 and 7 fathoms; continuing to steer in toward the shore, you will deepen to 8½ and 9 fathoms; there, the ground is composed of coarse brown sand, intermixed with small broken shells; the entrance of Baticolo River will then be open, bearing S.S.E. a little Easterly.

THE INTREPID ROCK was examined in H. M. S. Intrepid, and although the bearing of the entrance of the river from it is somewhat different from that of the Terpsichore, it seems probable that it was the same rock which was examined by both ships. By the Intrepid's account, the entrance of Baticolo River bears from it S. 52° W., the Sugar Loaf N. 79° W., and the Black Rock near the shore S. 86° W.

To avoid these dangers on the N.E. side of the entrance of Baticolo River, ships passing in the night should with the land wind keep the lead going, and not come under 24 or 25 fathoms water, which will carry them 1½ or 2 miles clear of the foul ground. With favourable weather in day-light, they may occasionally borrow to 19 or 18 fathoms towards it, and then will be from 2½ to 3 miles off shore, but near the edge of foul ground.

Venloos Bay and adjacent coast. VENLOOS BAY, or INLET, in lat. 7° 57′ N., lon. 81° 44′ E., bears from the entrance of Baticolo River N.W. by N. distant about 5½ leagues; the coast between them is low and woody, and may be approached occasionally to 10 or 12 fathoms; but in the night, large ships ought not to come under 16 or 18 fathoms, from 2 to 3 miles off shore. Venloos Inlet is rocky at the entrance, off which a ship may anchor in 12 or 14 fathoms, about 2 miles from the shore, but it is little frequented. When abreast of this place, the Sugar Loaf, which is the nearest high hill, bears to the S. Westward. About 6 leagues to the westward of the Sugar Loaf there is a hill, in the form of a quoin, and two smaller ones nearer the sea to the W.N.W. of Venloos, one called Baron's Cap, the other called the Small Quoin, being that nearest the coast.

Coast to Foul Point. From Venloos Bay to Foul Point, the S. E. extremity of Trincomalee Bay, the direction of the coast is about N.N.W. ½ W., and the distance 12 or 12½ leagues. It is generally low and woody, with steep rocks fronting the sea, but in many places there is a white sandy beach.

Ships passing between these places may sometimes meet with overfalls of 2 fathoms at a cast, the bottom being often rocky and uneven; in the night they may steer along in soundings from 18 to 23 fathoms, clear of all danger; with favourable weather, in day-light, the shore may be approached to 15 or 16 fathoms, and in some places to 10 or 12 fathoms. From 2½ to 4 leagues to the southward of Foul Point, a chain of rocky islets lines the shore, some of them about a mile from it, on which the sea breaks very high in bad weather. Another rocky islet, called Providien Island, is said to lie close to the shore, about 3½ leagues to the northward of Venloos Bay; the coast between them is rocky, and forms a bight.

To sail to the northward in the S. W. monsoon. Ships bound to the southern parts of the Coromandel Coast, or to Trincomalee, should, in the S.W. monsoon, keep near the eastern coast of Ceylon, in passing from the land about Aganis to the latter place; the land winds then blow very strong in the night, and frequently in the day, rendering it difficult for a dull-sailing ship to regain the

coast, if she unexpectedly get far to seaward, where the current generally sets to the eastward in that season. Near the shore, along the N.E. coast of Ceylon, the current is fluctuating in the S.W. monsoon, generally weak, and sets mostly to the southward.

There is at present very little variation of the compass around the Island Ceylon, or on the Malabar, or Coromandel Coasts.

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## TRINCOMALEE HARBOUR AND BAYS.

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TRINCOMALEE HARBOUR, with its BAYS, form a capacious inlet, the entrance to which, between Foul Point on the S.E. and Fort Frederick on the N.W., is between 5 and 6 miles wide, contracting, however, to about half that width, between Norway Point to the S.E., and Chapel Island on the N.W., when it again suddenly opens, forming Great Bay to the southward, and Trincomalee Harbour to the northward. To the westward of these, separated from the harbour by a peninsula, and connected by a narrow passage with the N.W. part of Great Bay, is Lake Tamblegam, which is navigable for boats only. *Trincomalee Harbour.*

The habour taken in its full extent is about 2 miles each way, indented by numerous bays and coves, and having in it several islands and many shoals and rocks.

FLAGSTAFF POINT, in lat. 8° 33½′ N., and lon. 81° 19′ E.,* or 60 miles East of Madras by my chronometers, and 8° 26′ E. from Bombay Castle by Captain P. Heywood's observations, is high, steep to seaward, covered with trees, and has on it several forts. This point is the northern extremity of a narrow and crooked peninsula, that bounds the East and S.E. sides of Trincomalee Harbour, and separates it from Back Bay; this peninsula being steep bluff land, fronting the sea, is easily known, as the coast is low near the sea, both to the northward and southward. *Flagstaff Point.* *Peninsula forming Trincomalee Harbour.*

The S.E. point of the peninsula, called Chapel Point, has an islet off it, called Chapel Island, and to the eastward a reef of rocks, distant more than half a mile, nearly on the edge of soundings, having 20 and 30 fathoms very close on the east and south sides; on the inner part of the reef, one of the rocks, Chapel Rock, is seen above water. Flagstaff Point is bold to, and safe to approach, but between it and Chapel Point, rocks stretch out from two small projections, which ought not to be approached under 14 fathoms.

The S.W. point of the peninsula, called Elephant Point, has an island, called Elephant Island, near it on the S.E. side, from which a reef, having 5 feet water on its shoalest part, projects to the westward. Osnaburg Point, the westernmost point of the peninsula, is a little further to the N.W., between which and Elephant Point there is a cove or safe harbour, with soundings from 8 to 14 fathoms.

The entrance of the inner harbour is not a quarter of a mile wide, formed by Osnaburg Point to the eastward and the Great and Little Islands to the westward, Little Island being the easternmost and close to the other. *Inner Harbour.*

* Captain Basil Hall, in 1814, made it in lon. 81° 21′ E. by stars East and West of the moon; and he made the variation of the compass 1° 9′ W.

About half a mile South from Great Island, and 1 mile West of Elephant Island, is Clapenburg Island, close to a point of the same name; and about a mile farther to the southward is a point, where the land is elevated a little, called Marble Point, with rocks projecting around. This point forms the western extreme of the Great Bay, separating it from the entrance of the harbour, and affords a mark for going in. To the westward of Marble Point, between it and the entrance of Lake Tamblegam, there is an Island, called Bird Island: to the S.E. of it lies Pigeon Island, called also Elizabeth Island, distant nearly a mile, having 10 and 12 fathoms water close to, and Round Island, nearly the same distance from the Point to the E.N.E., having 30 fathoms near it on the outside, then suddenly no ground. On the south side of this island there is a rock above water, and between it and Clapenburg Island, *but nearest the latter*, another, called Grummet Rock. The entrance leading to the harbour is formed by these islands and rocks to the S. W., and Elephant Island and Point to the N.E.

Foul Point.

Foul Point, the outer S. Eastern point of Trincomalee Inlet, bears S.E. $\frac{1}{2}$ E. $5\frac{1}{2}$ miles from Flagstaff Point, and has a reef projecting from it to the northward nearly a mile; the coast to the westward is slightly concave to Norway Point, which bears from Foul Point about W.S.W. between 2 and 3 miles. Between these points, nearly a mile off shore, is Northesk Rock, hereafter mentioned.

Great Bay, forming the southern part of Trincomalee Inlet, is upwards of 5 miles across in its widest part, but not more than 4 miles between Norway Point on the East, and Marble Point on the West. These are its entrance points, and lie nearly East and West of each other. The centre of Great Bay is very deep, having no bottom at 80 fathoms; soundings, however, are soon obtained on approaching the shore, and varying from 40 to 7 or 8 fathoms.

Four rivers, navigable by small boats, fall into the south part of the bay, nearly at equal distances from each other. The bank of soundings, lining the shores of the bay, extends very little outside the islets or rocks, except at the S.E. part, between the rivers Cotiar and Sambor, where ships may anchor in 10 or 12 fathoms regular soundings, soft mud, sheltered from easterly and southerly winds.

Anchorage.

Norway Point and Island.

The east side of the bay is bounded by Norway Point to the northward, which is about 2 miles to the W.S.W. of Foul Point: Norway Island lies on the west side of the point, having a rocky reef encompassing it, and the islets near it and the point. From this point and the island, a sand bank stretches about a mile to the southward, with soundings on it 3 and $3\frac{1}{2}$ fathoms, and 20 or 25 fathoms close to: to the westward of it, a quarter of a mile distant, there is no ground; but to the southward, between it and the River Sambor, there is good anchorage near the shore.

Norway Point and Foul Point must be avoided, on account of the reefs projecting from them about three-quarters of a mile, nor should the shore between them be approached, the soundings being irregular, and about half-way there is a very dangerous rock, distant from the shore about a mile, called Northesk Rock, from a ship of that name, lost there in 1748. Close to it, on the outside, are 12 and 14 fathoms, and 8 or 9 fathoms inside. When on it, Flagstaff Point bears N.W. by N., Norway Island S.W. by S., and a hill in the country touching Marble Point W. by S., and Foul Point E. by N., it making a transit line with these points.

Northesk Rock.

Mr. Joseph Higgs, master attendant at Trincomalee, has given the following directions for making the harbour.*

* See *Nautical Magazine* for 1839, p. 237.

"There is some difficulty in making the Port of Trincomalee during the months of October and November, from the strong current which sets to the Southward at the rate of 2½ or 3 knots; and from the light variable winds, with occasional squalls and thick weather, which prevail until the N.E. monsoon sets in, about the end of the latter month. Several cases have occurred of vessels of war being swept to the Southward during that period, and of not being able to regain their ground for several days. H.M.S. Melville was ten days trying to sight the port before she succeeded." Mr. Higgs' Directions.

"Ships, therefore, bound there in October and November, or indeed from the end of September to the end of March, should endeavour to make the land in about 9° 0′ N., which is 15 miles to the southward of Molativa Shoal. The coast is there clear, and may be safely approached to 20 fathoms, even by night. If the land be made towards the close of the day, the ship's head should be put to N.N.E. or N.E., and a rate of 3 or 4 knots preserved during the night. Should the wind be N.E., it would be advisable to keep working to windward, and when standing to the N.W. the lead should be kept *constantly* going, and the ship tacked to the eastward as soon as the water is shoaled to 22 or 20 fathoms."

"At day-light run in for the land on a N.W. or W.N.W. course. Should it be made to the northward of Pigeon Island, a course should be steered to keep outside that island, and not to haul in till the ship has run 3 or 4 miles to the southward of it. She may then steer direct to the Flagstaff Point of Trincomalee. The nearer the point is approached, the more will the influence of the current be avoided; and though the sea breeze may be very weak, yet a vessel will seldom fail to reach the port."

"The position of Pigeon Island and its adjacent rocks and shoals render the approach to the shore at night during the above-mentioned period, a task of much anxiety; and as a vessel will naturally close the land as much as safety will permit, great care should be taken in allowing for the constant set of the current to the S.S.E. of at least 2½ knots."

"From March to September there is no difficulty in making Trincomalee, for although the current in the offing sets to the northward, it seldom runs more than one knot near the shore."

"Between the lat. of 7° 0′ and 9° 30′ N., the shore may be safely approached to 22 fathoms at night, and to 15 fathoms in the day."

TO SAIL INTO HARBOUR, with a fair or leading wind, a ship may enter the bay, keeping nearly equal distance from each side; when Round Island and Marble Point are discerned, the Point ought to be kept about W. by S. ½ S., open to the northward of that island, until the harbour's mouth is open. No soundings will be obtained in the middle of the bay. When Round Island or Elephant Island is approached, she ought to steer in about mid-way between them, and will then have soundings; after hauling to the N.W. for the harbour, care must be taken to give a berth to the reef, stretching from Elephant Island by not coming under 10 or 12 fathoms towards it. When a ship going into the harbour first opens the channel between Elephant Island and the main, she is nearly abreast of that reef; when wide open, she is past it. On the hill of Osnaburg Point, there is a battery built with brick on the eastern part of the fortification, higher than any battery there, and easily distinguished. The flank of this battery kept on with Elephant Point would carry a ship close to the shoalest part of the reef, where there is only 5 or 6 feet: but the battery kept open with the point, which is the best mark, will carry her clear of it, in not less than 10 fathoms. To proceed into the Harbour.

There are 24 and 30 fathoms between the points that form the entrance of the harbour, and after passing the reef contiguous to Elephant Island, a ship should steer direct for it; although narrow, either of the points may be approached within a ship's length, and when through this narrow part, a spacious harbour appears, where a great navy may anchor in good ground, sheltered from all winds, with several coves, convenient for careening ships.

When within the entrance, it is prudent to steer to the N.N.W. to avoid the shoal within Osnaburg Point, and York Shoal farther to the northward. The former has only 11 feet water on it; with York Island and Flagstaff Point in one, and Pigeon Island and the low part of Osnaburg Point in one, a ship will be in 5 or 6 fathoms on it, and close to the shoalest part. It is small, with deep water all round; between it and the shore, near Osnaburg Point, there are 7 and 8 fathoms.

York Shoal has only 5 feet water on its shoalest part; to avoid it, a ship in steering up the harbour must keep Round Island a little open with Osnaburg Point; but there seems no good land-mark to point out when a ship is to the northward of it, that she may haul to the eastward for the anchorage abreast the town. When the Intrepid's boat was at anchor on its outer edge in $3\frac{1}{4}$ fathoms, within a ship's length of its shoalest part, Round Island bore S. $\frac{3}{4}$ E., seen over the low part of Osnaburg Point, the centre of York Island E.N.E. $\frac{3}{4}$ N. and the N.W. point of Great Island nearly W.S.W. $\frac{1}{2}$ W. With this bearing of Round Island, the shoal is not more than half a cable's length from North to South; and it is steep all round.

Anchorage, &c.

Ships may moor abreast the town to the N. Westward of York Island, also to the northward of Great Island, or in any other part of the harbour, clear of the shoals.

In the S.W. arm of the harbour, between Great Island and the point to the N.W. of it called Round Point, there is a Rock nearly mid-way, not more than 3 fathoms in diameter, with 9 feet water on it, and from 7 to 9 fathoms all around. It is not in the way of ships, unless they anchor in that part of the harbour, to cut wood in the S.W. monsoon. Round Point bears from this rock N. by E. $\frac{1}{2}$ E., and the N.W. point of Great Island S. $\frac{1}{2}$ E. When on it, the middle one of three windows, in a long white barrack on Osnaburg Point, is on with the easternmost point in sight of Great Island, and a point of land near Clapenburg Cove open about a boat's length with the N.W. point of Great Island.

About two cables' lengths to the northward of the Grummet Rock, between it and the outer point of Clapenburg Island, lies the outer part of a ledge of rocks, with only 10 feet water on it, and 10 fathoms close on the outside; and it may be observed, that all the shoals in the bay, or in the harbour, are generally steep to.

To work into the bay.

WORKING INTO THE BAY WITH AN ADVERSE WIND, observe, that when the wind blows strong from westward, there is a strong outset from the southern part of the bay, rendering it difficult to work in at times during the S.W. monsoon; ships then bound to Trincomalee generally fall in with the land to the southward of the bay. The reef projecting from Foul Point, about half a mile to the northward, is not very dangerous, as the depths decrease regularly to 4 and 5 fathoms close to its N. Eastern verge, and from thence the bank of soundings extends about 2 miles to the northward, where 36 and 40 fathoms are got on its northern extremity; with Flagstaff Point bearing W. $\frac{1}{2}$ N., and Foul Point S. $\frac{3}{4}$ E., the next cast no ground. In passing Foul Point, you may borrow into 14 fathoms; when about a mile to the northward of it, or when Marble Point opens to the northward of Round Island, bearing W.S.W.

a little westerly, then haul up for Flagstaff Point if the wind permit. For a considerable space between these points no soundings are obtained in crossing.

To avoid the outset from the bay, work in abreast of Back Bay and Flagstaff Point, which Point is safe to approach, close to it the depths being 15 and 16 fathoms. When in with this land, take care, in rounding Chapel Point, to give a berth to the reef stretching from it about half a mile to the eastward, having from 30 to 50 fathoms close to it on the S.E. side, and no soundings about a quarter of a mile from it. In coming from the North towards it, borrow not under 18 or 20 fathoms, but the mark to clear it is a white rock, like the wall of a house, on the inside of the north point of Back Bay, called Elizabeth Point, kept about a sail's breadth open with Flagstaff Point. When round this reef, you may borrow on Chapel Island and the northern shore until past Elephant Island, which are all steep to, without soundings until very close to the shore, and no danger but what is visible. In standing to the southward, do not borrow under 20 fathoms towards Northesk Rock, Norway Island, nor any part of the coast between it and Foul Point, where the bottom is rocky with irregular soundings, and Norway Island is surrounded by dangers. It is not advisable to stand farther to the southward than to bring Round Island on with, or just touching Marble Point, until well to the westward of Norway Island; and this mark will carry you clear of all dangers on that shore.

Being to the westward of Norway Island, do not stand too soon to the southward, towards the bottom of the bay, on account of the sand bank, with 3 fathoms on it, extending about a mile to the S.S.W. of that island, having 15 and 16 fathoms water within half a ship's length of it, and at a small distance no soundings. To pass clear to the westward of this danger, a great tree on the middle of the land forming Flagstaff Point should be kept on with, or just touching Chapel Point, until the small island at the entrance of the lake is open to the southward of Pigeon Island; you will then be clear to the southward of all the dangers off Norway Point. If in standing to the southward the tree open with Chapel Point, tack to the northward, to keep it on, or shut in with the Point, until past these dangers.

In approaching the bottom of the bay, the lead must be kept going; for although there are no soundings within a mile of the shore in some places, the first cast may be 35 or 40 fathoms, then 18 or 20, and the next cast probably 10 or 12 fathoms. It would be imprudent to go under 12 or 14 fathoms, as the distance from these depths is not more than 1 or 2 cables' lengths in some places to 4 fathoms, at the distance of a quarter or half a mile off the shore; but to the southward of the bank stretching from Norway Point, in the S.E. corner of the bay, the soundings are more regular, and extend farther out, where ships may anchor, as already observed.

In standing to the northward for the entrance of the harbour, you may pass close to Round Island, it being steep to; from thence you will probably reach the harbour's mouth without tacking, and ought to keep close to the weather shore in entering it. After being within, anchor on the east or north side of Great Island, or where it may be most convenient.

BACK BAY, on the north side of the Peninsula, which separates it from Trincomalee Harbour, is about 4 miles wide and 1 mile in depth, bounded by Flagstaff Point to the southward and Elizabeth Point to the northward. The common anchorage is in the southern part of the bay, in from 7 to 12 fathoms sandy bottom, with Flagstaff Point bearing from S. by E. to S.E. by S., distant 1 or $1\frac{1}{2}$ miles. Back Bay and anchorage.

The soundings decrease gradually to the sandy beach, except about $1\frac{1}{4}$ miles to the N.W. of the point, rocks project from the shore to 4 fathoms. Ships may lie securely in this anchorage during the S.W. monsoon, and procure supplies of wood and water. Buffalo beef may be got, but vegetables and other refreshments are scarce. Ships of war sometimes go into the harbour to careen, or to escape the bad weather often experienced on the N.E. coast of Ceylon, and on the Coromandel Coast, at the commencement, or early part of the N.E. monsoon; but there being little trade carried on at Trincomalee, it is seldom frequented by merchant ships.*

To approach the land in either monsoon.

From September to March, a ship bound into this port should take care not to fall in with the land to the southward of Flagstaff Point, as the currents often run strong to the southward on the east coast of Ceylon during the N.E. monsoon. On the same coast, they are liable to fluctuate in the S.W. monsoon, though it is then prudent to fall in with the land, rather to the southward than to the northward of the port.

North part of Back Bay.

Distant about $1\frac{1}{2}$ miles to the S.S.E. of Elizabeth Point, in the north part of Back Bay, there are several rocks under water, having $5\frac{1}{2}$ or 6 fathoms close to them on the outside, and 5 fathoms within. Directly to the eastward of the same point, distant three-quarters of a mile, two rocks are seen, about the size of a boat, with others under water projecting from them about a quarter of a mile to seaward; these are called the Lively Rocks, having foul ground 7 and 8 fathoms very close to them, and should not be approached nearer than 12 fathoms on the east side.

Lively Rocks.

Other rocks.

A ship being abreast of Elizabeth Point and the Lively Rocks ought not in coasting to the northward to come under 18 fathoms, on account of several sunken rocks between that point and Pigeon Island, which are dangerous to ships making too free with the shore. Two of these rocks bear about N. $\frac{3}{4}$ W. from Flagstaff Point, and S.S.E. $\frac{1}{2}$ E. from Pigeon Island, nearly mid-way between these places, distant about 2 miles from the shore, and lie near each other. The ship Fairlie struck on the southernmost rock in 1797, and found it about 20 fathoms in diameter, with 16 feet water on it, and from 9 to 11 fathoms close to it all round. H.M.S. Diomede struck on the other, thought to be about half a mile farther to the northward, and after getting off, sunk about 3 miles to the northward of Flagstaff Point; the depths close to the Diomede Rock were 9, 10, and 11 fathoms, by which it seems probable that the Fairlie Rock and it are the same, although they are generally considered as different rocks.

Pigeon Island and rocks.

PIGEON ISLAND, in lat. 8° 42′ N., bearing about N. by W. $\frac{3}{4}$ W. from Flagstaff Point, distant 3 leagues, is a rocky island, with some shrubs on it, encompassed by islets and rocks above and under water, with others between it and the shore, where there is no safe passage except for boats. Although it may be approached to 16 or 18 fathoms on the outside, it is advisable to pass at the distance of $1\frac{1}{2}$ or 2 miles from it, in soundings from 21 to 24 fathoms.

Bank of soundings.

The bank of soundings between Flagstaff Point and Pigeon Island seldom exceeds 3 or 4 miles' distance from the shore, and from 40 to 42 fathoms it has a steep declivity in most places to no ground.

* Exclusive of the difficulty of procuring vegetables and other articles of refreshment at Trincomalee, it is generally considered an unhealthy place, being surrounded by low marshy land.

The land winds are very noxious to Europeans who sleep on shore, exposed to them in the night: many seamen of H.M. fleet, under the command of Admiral Hughes, by exposure to these winds, were seized with spasms, which generally ended in speedy death.

On the north side of Back Bay, a little inland, there is a hill of a conical form, and another hill to the N.W. of Pigeon Island, called Mount Erasmus, having on it a tower or pagoda; but the land facing the sea is low.

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## CEYLON, NORTH-EAST AND NORTH COASTS, FROM TRINCOMALEE TO POINT PEDRO.

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A SHIP leaving Trincomalee, or being abreast of Flagstaff Point in the S.W. monsoon, and bound to the southern part of the Coromandel coast, should keep near the N.E. coast of Ceylon, as the wind frequently hangs far to the westward, and blows fresh over the northern part of the island. A course about N. by W., if near Flagstaff Point, will be proper, until clear to the northward of Pigeon Island, taking care not to borrow under 22 or 24 fathoms in the night, nor under 18 or 20 fathoms in the day, toward that island, or toward the Diomede and Fairlie Rocks. From Trincomalee to the northward.

MOLEWAL, or MOLATEEVA HOUSE, in lat. 9° 13′ N., lon. 81° 1′ E., stands close to the sea, and bears about N.W. by N. from Pigeon Island, distant 13 leagues; the coast between them is low, and safe to approach to 18 or 20 fathoms in the night, if the lead is kept going, or to 12 fathoms occasionally, when working in day-light. About 3½ leagues from Pigeon Island there is a small river, and 4 leagues farther to the N.W. is the river Cocklay. Molewal and adjacent coast.

From Molewal House, a dangerous Coral Shoal, having only 2 fathoms water on it, called MOLEWAL SHOAL, extends to the eastward and north-eastward near 4 miles from the shore, which ought not to be approached nearer than 13 fathoms. As there are 20 and 21 fathoms water about 4 miles from the shore,* and 4 or 5 miles to the south-eastward of the shoal, a ship should edge out a little when near it; but when abreast of its eastern extremity, she may with the land wind borrow towards it to 13 or 14 fathoms. The north side of this shoal is not so steep, but is composed of detached knolls, the depths decreasing regularly to 9 or 10 fathoms close to its northern verge, and to 6 and 7 fathoms along the N.W. part close to the shore. From this shoal, the coast is low to the N.E. point of Ceylon, with 7 fathoms water near the sandy beach, but care is requisite to avoid the following danger. Molewal Shoal.

POINT PEDRO SHOAL encompasses the N.E. extremity of the island, and from thence stretches nearly parallel to the coast about 6 leagues to the S.S. Eastward, having only 3 and 3½ fathoms on it in many places, and 2½ fathoms on two patches; one of these bears nearly E. ¾ S. from Point Palmyra, the north-east extreme of Ceylon, distant about 5 miles; the other, N.E. from the same point, distant 4 miles. Point Pedro Shoal.

Between this extensive narrow shoal and the coast there is a safe channel about

* His Majesty's ship La Sensible ran on shore under a press of sail about 3 leagues to the southward of Molewal, and was wrecked on the steep beach, occasioned by an error in the *dead reckoning*, the effect of a westerly current.

3 miles wide, with regular soundings, soft mud, 7 fathoms close to the shore, 7, 8, or 9 fathoms in mid-channel, and 5 or 6 fathoms close to the inner edge of the shoal. To the eastward of it the bank of soundings is also flat, with regular depths, decreasing to 5 and 6 fathoms close to the south-east and eastern parts of the shoal, and to 4 fathoms coarse brown sand close to its north-eastern verge.

Captain P. Heywood, in August, 1802, worked round the south end of Point Pedro Shoal, in His Majesty's ship Leopard, and passed between it and the coast, through the Inner Channel to Point Pedro village; here he remained some time, and, with the assistance of the Providence schooner, completed a laborious survey of the shoal, and the banks of soundings contiguous to the north end of Ceylon; which survey had previously been begun, and carried on from Molewal Shoal, by Mr. Duncan Weir, master of His Majesty's ship Suffolk.

Passage inside of Point Pedro Shoal.

To pass inside of Point Pedro Shoal, Captain P. Heywood gave the following instructions. Ships coming from the southward, and intending to pass between Point Pedro Shoal and the coast, after passing Molewal Shoal in 12 or 13 fathoms, ought to observe, that the coast from thence takes a direction about N.W. by W.; but it is not advisable to haul in for the land nearer than 9 fathoms, until in lat. 9° 28′ N., between which latitude and the south tail of Point Pedro Shoal there are good soundings from 9 to 6 fathoms, the nearer the shore, the more regular.

Should the wind hang at N.W., making it necessary to beat, come no nearer the tail or inner edge of Pedro Shoal than 6 fathoms, but to the shore, you may borrow by distance, as it is steep to, all along, with 7 fathoms at the distance of one or two cables' lengths.

If the wind is free, when in lat. 9° 28′ to 30′ N. steer in West, to get sight of the house, which bears S.W. ½ S. from the south point of Pedro Shoal, and when seen, is an excellent mark for entering the channel; but at present it is so dark-coloured, and being somewhat lower than the land and trees behind it, is with difficulty discerned till very near. With this west course, you will carry generally more, but never less than 6 fathoms close in to the shore, along which you may steer at any convenient distance,

Palmyra Point.

as the wind may be, until you raise PALMYRA POINT, which is the N.E. point of Ceylon, remarkable by high Palmyra trees growing on it, rendering it conspicuous when seen either from the S.E. or N.W., and it is in latitude 9° 49′ N., and 58 miles West of Trincomalee Flagstaff, or in lon. 80° 26′ E. From this point, a small breaking reef projects about a quarter of a mile; the Leopard rounded it in 7 fathoms at the distance of half a mile, and anchored in that depth, with the village of Point Pedro bear-

Village.

ing S. 21° W., and Palmyra Point S. 41° E. The village is between these points, which bear about E. ½ S. and W. ½ N. from each other near 3 miles, Point Pedro being the northernmost part of the island; from hence, the coast extends to the N.W. point of

North coast of Ceylon.

the island W. ½ S. 15 or 16 miles. This north coast of Ceylon is steep to, all along, with 6 or 7 fathoms water close to the shore, between which and the banks there is a fine channel from 3 or 4, to 9 miles wide, with regular soundings from 7 or 8, to 5 fathoms over a bottom of blue mud.

To round Point Pedro Shoal.

SHIPS coming from the southward, and intending to round outside of Pedro Shoal, after passing the south point of it, should not borrow on its outer edge to less than 8 or 7 fathoms, till in lat. 10° or 9° 58′ N., where they may haul round to the westward, observing to keep *that depth* good, until Palmyra Point bear S.W. by S.; *then, if the wind be free*, may steer for a very remarkable gap or vacancy in the trees, shoaling gradually to 5 fathoms, from coarse sand intermixed with shells and red coral, to very fine

white sand, of which the 5 fathoms bank is composed. This gap in the trees should, if possible, be brought *to bear South* in 6 *fathoms*, before you shoal on the bank to 5, and if kept on that bearing, there is not less than 5 fathoms quite across the bank. Having deepened over it to 6 fathoms muddy bottom, in the channel, any part of the coast may be steered for direct.

To proceed to the north shore of the island.

If the wind be from the South or S.W. when a ship has rounded Pedro Shoal, with Palmyra Point bearing S.S.E. or S.E. by S., and in 6 or 7 fathoms, she cannot lie up better than West or W.N.W.; she may stand on, along the 5 fathoms bank till the gap in the trees bears S.S.E. ½ E., but *no farther*, because N.W. by N. from the gap, and West of the 5 fathoms line of soundings, lies the eastern verge of a hard sand bank, with only 3 and 3½ fathoms on it, from which Palmyra Point bears S.E. ¼ E., 14 or 15 miles, and the N.W. Point of Ceylon S. ¾ W. 11 or 12 miles. From this tacking position, if the wind permit, she may steer for the gap, as before directed, or haul to the wind again on the starboard tack, and stand to the S.E., or E.S.E. and East, till Palmyra Point bear S.E. by S.; but if she has laid up well to the southward, and *deepened over the 5 fathoms bank* to 6 or 7 fathoms mud soundings, she may bring it to bear S.S.E. with safety. Another good turning mark, while in 5 fathoms, is the gap from S. by W. ¼ W. to S.S.E. ½ E., which space formed by that angle *on* and *across* the bank has not any less water than 5 fathoms.

Point Calymere.

SHIPS coming from Point Calymere towards the north coast of Ceylon, or being bound to the anchorage at Point Pedro village, should pass the former point in about 9 fathoms, and from this depth, with the Pagodas bearing West, if there is not any current, a S.S.E. course will take them into 6 or 5½ fathoms in sight of the Gap bearing South, when they should follow the foregoing directions.

The Gap mark.

The Gap is about 6 miles to the westward of Palmyra Point, and in coming from the eastward it begins to open, bearing S. by W. Westerly; as the north coast of Ceylon, on both sides of it, is luxuriantly clothed with the Palmyra tree, it seems probable that the Gap has been made by the Dutch, that the vacant space might answer as a pilot's mark to *themselves*, without it appearing such to strangers; for it is very conspicuous, and in the most eligible situation for that purpose. At a small distance to the eastward of it there are two very small vacancies in the trees, which a stranger might *at first* mistake for the true one; but to distinguish the true Gap, observe, that when in 5 or 6 fathoms it bears S. by W., there is a single Palmyra tree detached from the rest appearing in the middle of it, between which and Point Pedro, the north point of the island, the two *false vacancies* are situated; but they are so small in comparison of the true one, when seen *together*, that they cannot be mistaken.

False Gap marks.

From Point Pedro village to the northward.

Ships leaving the anchorage at Point Pedro village to go to the northward should steer about N.W. ½ N., to bring the Gap to bear South when in 6 or 5½ fathoms white sand on the southern edge of the bank; then a North course will carry them over it in 5 fathoms, and the depth of water, when the land begins to sink with the eye elevated 24 or 25 feet, will be 7 or 8 fathoms, the bottom coarse sand mixed with coral.

From Ceylon to Point Calymere in the S.W. monsoon.

SHIPS bound from the east coast of Ceylon to the Coromandel Coast, after passing Molewal Shoal, may steer along the bank of soundings, taking care not to come under 9 or 10 fathoms in the night, until in lat. 10° 0′ N.; being then clear to the northward of Point Pedro Shoal, they may borrow into 8 or 9 fathoms occasionally, in crossing over to Point Calymere, which bears from Point Palmyra about N.W. ½ N., distant 13 leagues. From 10 to 20, or 25 fathoms, are good depths to preserve, in passing

from Molewal Point to Calymere in the S.W. monsoon; the depth will decrease considerably abreast of Point Pedro Shoal, and to the northward of it, in steering a direct course between them, but there is no danger if a ship do not come under 9 or 10 fathoms.

If a ship borrow under 15 fathoms, attention to the lead will be requisite in crossing, as the current sometimes sets to the westward in the S.W. monsoon, into Palk's Bay, formed between the north part of Ceylon and the continent. When a ship is bound to Madras, or farther to the northward, she need not be particular in borrowing so close to the Points Palmyra and Calymere, but it is prudent to keep in soundings, and she ought to be certain to make the coast of Coromandel well to the southward of her port of destination, for the current frequently sets very strong to northward along that coast in the S.W. monsoon.

Although the current during the S.W. monsoon sometimes sets into the bay between the continent and the north part of Ceylon, it more frequently sets in the opposite direction to the eastward, rendering it proper to keep within a moderate distance of the land; for a dull-sailing ship happening to round the east side of Ceylon at a great distance in the strength of the S.W. monsoon would probably not be able to make the coast until to the northward of Madras, which has often been experienced.

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# PALK BAY, WITH THE WINDS AND CURRENTS ON THE EAST COAST OF CEYLON.

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## PALK BAY.

Palk Bay. PALK BAY, or GULF, between the continent and the north part of Ceylon, and named after Governor Palk, by the Dutch, is not frequented except by boats and small coasting vessels; the water being usually shoal all over it, 6 or 7 fathoms in some places, to 4, 3, and 2 fathoms towards the main, renders the navigation unsafe for large ships. It is bounded by Adam's Bridge and its contiguous islands to the southward, and by Calymere Point and the coast of Tanjore to the northward and westward, and by the North part of Ceylon with its islands to the eastward. The Dutch describe *three* channels formed between Calymere Point and the north end of Ceylon, which lead into Palk Bay; but the southern channel, called Palk Strait, contiguous to the north coast of Ceylon, is probably the only one that may be considered safe for large ships.

Palk Strait.

Directions have been given for sailing to the north part of the island through this channel, by using the Gap in the trees as a guide; and it is about 3 leagues wide from the N.W. point of Point Pedro Shoal, across the 5 fathoms bank in a W. by N. direction to a bank of 3 fathoms sand, which bounds it on the N.W. side. This 3 fathoms bank bears N.W. by N. from the gap in the trees, distant 3 leagues from the nearest part of Ceylon, having regular soundings 6 and 7 fathoms between it and the island, till close to the shore; and the 5 fathoms bank, of an elliptic form, occupies the space between it and the north end of Point Pedro Shoal.

The second channel, called by the Dutch Kelsal Channel, nearly mid-way between Point Calymere and Ceylon, formed by the 3 fathoms bank to the S.E. and an extensive bank to the N.W., is about 6 or 7 miles wide, the depth of water in it from 4 to 5 fathoms; there are no marks for sailing through, it being too distant from the land. The bank that bounds this channel on the N.W. side, sometimes called the Middle Bank, has on it 3 and $3\frac{1}{2}$ fathoms hard sand; it extends from lat. 10° 7′ to 10° 17′ N., being upwards of 3 leagues in length about N.N.W. and S.S.E., and nearly joins the shoals which project from Point Calymere. There is also said to be a spot with only 10 feet on it at low water springs; its steepest part is to the southward, where it shoals rapidly from 5 to 2 fathoms and then to 10 feet. This danger bears S. 20° E. $8\frac{1}{2}$ miles from Point Calymere, and S. 44° E. from two remarkable and isolated brab trees to the westward of Kedgeree. Between these and the bank *there is said* to be a passage 5 or 6 miles wide, called Baker Channel, with $4\frac{1}{2}$ fathoms water in it, whereas, there are only two or three narrow guts from half a mile to a mile wide, the deepest water in them 4 fathoms, and 3 or $3\frac{1}{2}$ fathoms between them, the bottom all hard sand; the passage, therefore, in this part, seems safe only for small vessels.

Kelsal Channel.

Other narrow channels.

From Point Calymere, shoal water projects far out all round, but the depths decrease gradually towards it; about 4 miles from it on the east side there are $3\frac{1}{2}$ and 4 fathoms, and 6 miles to the southward of it only 3 or $3\frac{1}{2}$ fathoms, to the westward of the long middle bank, and the narrow guts above described.

Point Calymere.

From Point Palmyra, the N.E. point of Ceylon, Point Pedro,* the northernmost part of the island, bears W. $\frac{1}{2}$ N. about 3 miles, and is about mid-way between the former point and the gap in the trees, and the village is about mid-way betwixt those points. From Point Pedro, the north coast of Ceylon extends W. $\frac{1}{2}$ S. and W. by S. about 5 leagues, and is low, covered with Palmyra trees; the soundings along it are regular from 7 fathoms within 2 or 3 cables' lengths off the shore, decreasing to $4\frac{1}{2}$ fathoms about 3 leagues off, on the edges of the banks which bound the northern side of Palk Strait.

North Coast of Ceylon.

The Dutch description of the navigation of Palk Bay, practicable in some places only by small vessels, is nearly as follows. Hamenhiel Fort stands on a small island, among other larger islands situated near the N.W. part of Ceylon. When 5 or 6 leagues to the westward of Point Pedro, you perceive Valy Point, to which you must give a berth of 3 leagues on account of a bank with only 3 fathoms upon it; the N.W. point of Ceylon must be passed before Hamenhiel Fort is perceived, and when this point bears S.E. by E. the small island will bear about S. by W. or S.S.W.; you may then steer towards it, bringing the fort to bear S. by E., and anchor in $4\frac{1}{2}$ or 4 fathoms. In May, June, and July, the S.S.W. winds are very violent in these parts, and the tides strong.

Dutch account of the navigation of Palk Bay.

Jafanapatam, in lat. 9° 43′ N., is 5 leagues to the eastward of Hamenhiel; the channel is within the islands, and having but 4 feet water in some places, is only frequented by the country boats, although there is a considerable coasting trade carried on with this place.

Jafanapatam.

From Jafanapatam to Calimony Point, the course is E.S.E. 3 leagues, the depths of water only 12 or 13 feet; near the point there is a rock, with only $3\frac{1}{2}$ feet water upon it. The anchorage at Calimony is in $3\frac{1}{2}$ fathoms about two miles off shore.

Calimony.

Polan-Diva, called also Cat Island and Enkhuysen, is small, and lies 3 leagues S.W. by S. from Calimony Point; a sand bank projects from the island about a mile, and the depths are 5 and 6 fathoms fine sand, in the fair way between these places.

Polan-Diva.

* This has usually been called the north-easternmost point of the island in former works.

Two Brothers. Two Brothers are small islands about S.S.W. from Polan-Diva, distant 2 or 3 leagues; they should not be approached nearer than 2 miles, on account of a rocky reef stretching out to the westward.

Manar Island. Manar Island, the east part, is 6 or 7 leagues to the southward of the Two Brothers; near the latter, in the fair way, the depths are 5 and 6 fathoms, decreasing towards Manar, on approaching which, the Portuguese church, called Madre de Deos, will be seen; when this bears S.W., a small vessel may borrow into 10 or 12 feet water within half a mile of the shore.

Manar is of considerable extent, and from its west end, the distance is about 8 or 10 leagues W. by N. to the Island Ramisseram, but a vessel must steer first N.W. by N. 6 or 7 leagues to get into 6 fathoms ooze; in approaching the N.E. point of the latter island, the lead should be kept going, for when in 5 fathoms the depth decreases half a fathom at each cast.

Catche-Diva and Cow Islands. CATCHE-DIVA ISLAND lies E.N.E. 4½ leagues from the N.E. point of Ramisseram, and 4½ leagues farther on the same bearing lies Cow Island, called also Delft Island, which is the westernmost of the islands at the N.W. part of Ceylon; it is about 7 miles long, and bears S.W. by S. from Hamenhiel Fort; the depth in the fair way, between these islands, is 6 or 7 fathoms.

Hamenhiel and Devipatam. From Hamenhiel Fort, the town of Devipatam, on the opposite side of Palk Bay, is distant about 20 leagues to the W.S. Westward; about 6½ leagues from the fort there is a sand bank, having on it only 9 or 10 feet water, and in approaching the main, attention to the lead is requisite, as the depths are only 2½ and 2 fathoms, 5 or 6 miles from the shore; the whole of the coast bounding the west side of the bay is lined with shoal water from Devipatam to Point Calymere.

## WINDS AND CURRENTS.

Between Point Calymere and Ceylon. DURING THE NORTH-EAST MONSOON the current frequently sets to the S. Westward into Palk Bay, between Point Calymere and Ceylon; ships, therefore, which are bound from the southern part of the Coromandel coast to Trincomalee in this season, should be cautious to keep well to the eastward in crossing, to prevent being drifted near the shoals off the north end of Ceylon. Gales of wind, blowing directly upon the shore, are liable to happen in November, December, or January,* sometimes making a close approach to the N.E. side of the island dangerous. Several vessels have been driven on shore and wrecked by these gales, but they are not frequent.

North-East gales. In the Carron, we left Madras 6th January, 1795, bound to the Malabar coast, and carried a strong N.E. and E.N.E. wind with cloudy weather, which deprived us of sights of the sun or stars for latitude or chronometers. On the 8th, at 2 P.M., steered S.W. by S. to get a sight of Ceylon before night, and soon saw Flagstaff Point bearing West, distant 5 or 6 miles, with the surf breaking high on the rocky shore; the weather being dark and cloudy at the time, a hard squall followed, which increased to a strong gale in the night, with frequent squalls and rain. After dragging along shore to the S. Eastward for several hours in 28 and 30 fathoms, we shoaled into 24 fathoms and wore, finding we could not clear the coast on the larboard tack; but on the star-

* His Majesty's ship Sheerness, and two other ships, in Trincomalee Inner Harbour, were driven on shore and wrecked in one of these severe storms. It commenced at sun-set, 7th January, 1805, in a dreadful hurricane at N.W., with heavy rain, and shifted suddenly to N. E., when they parted all their cables and drove on shore.

board tack we deepened our water and cleared the coast. The ship was at this time in excellent trim, sailed remarkably well in beating off against a heavy sea, although under a low sail; an indifferent sailing ship would, *probably*, not have been able to beat off shore; it is therefore prudent for ships bound to the southern part of Ceylon, in December and January, when the weather looks threatening, not to come close to the island until they get into the latitude of its easternmost limit, from 7° 20′ to 7° North.

The Lord Thurlow and Rodney, in company, left Madras 26th February, 1796, bound to the southward; at 5 A. M., 2nd March, steering S. S. E., the Thurlow grounded on the northern extremity of Point Pedro Shoal and made the signal, the Rodney immediately tacked, touched the ground in stays, and when about, had 4¾ fathoms, hard sand. Not apprehending themselves so near the land, they did not sound, but when observations were taken at noon, they found a current had set them considerably to the westward, and made the part of the shoal on which the Thurlow grounded 5 miles to the eastward of Madras by chronometers, and in about lat. 9° 57′ or 58′ N.,* distant from the shore 7 miles. The grounding of the Lord Thurlow.

In October and November the weather is often unsettled, with squalls, rain, light baffling winds, and frequent calms along the N.E. and East coast of Ceylon, with strong currents running to the southward; ships bound to Trincomalee in these months, or at any time in the N.E. monsoon, should endeavour to get into soundings to the northward of that port, to prevent being carried past it by the currents. Weather in October and November.

On the 28th November, 1796, a squadron of the Company's ships † left Madras, bound to Trincomalee, had light northerly winds and calms with a current running strong to the southward, which carried them to the southward of the Basses. On the 15th December, they were in lat. 6° N., no land in sight; the southerly current then abated, and with the wind at E.N.E. and N.E., they reached Trincomalee on the 20th, after a passage of twenty-two days from Madras. Strength and direction of the current.

In October and November a strong current may always be expected to set along the east side of the island to the southward, when the wind is from the northward, or when it is light and variable. Off the Great Basses, it then sets to the southward at times 1½ and 2 miles an hour; at other times it is weak, and follows the direction of the land to the westward as far as Point de Galle, or even to Colombo; this has also been experienced in March when the winds were faint and variable.

The southerly current that runs along the east side of the island during the N. E. monsoon is generally deflected from the shore to seaward about the Great Basses; and at the S.W. part of the island, near Point de Galle, it sometimes sets off shore, but seldom very strong.

When the wind blows strong along the shore on either coast, the current is generally governed by it, and runs strong to the eastward along the south side of the island with the steady winds which prevail in the westerly monsoon; but in this season, on the eastern coast, the winds, although variable, are generally from the land, and a drain of current often sets to the southward between the Friar's Hood and the Basses.

The high land is often enveloped in clouds, from the great quantity of vapour with which this island is generally covered; and when these clouds are unusually dense, severe squalls blow at times from the land, which require caution, as they give very little warning. These squalls are liable to happen at the changing of the monsoons, or during the strength of the S.W. monsoon. Squalls from the land.

* Captain Heywood, in his survey of the shoal, makes the northern extremity in lat. 9° 56′ N.

† The Asia, Manship, Goddard, Camden, Pitt, and Lord Macartney.

Passage from Ceylon towards Bengal or the Coromandel Coast in the N. E. monsoon.

Ships bound from the Malabar coast to Bengal, or the Coromandel coast, in the N.E. monsoon, usually work along the south coast of Ceylon to the Great Basses, or farther when it is practicable, then stretch off to the eastward into the open sea, where they meet the monsoon steady, and get clear of the southerly current, running along the east side of the island during the strength of the monsoon.

In standing across the bay to the eastward, a westerly current is generally experienced,* particularly within 20 or 30 leagues of Ceylon; it is, therefore, prudent to stand off several degrees from the island, and then take the advantage of favourable shifts of wind to work to the northward in the middle of the bay, where brisk gales from the southward, of short duration, are at *times* liable to happen, even in the strength of the N.E. monsoon, although not always to be expected.

In the latter end of February, or in March, when the force of the N.E. monsoon is abated, there is at times little southerly current running along the east coast of Ceylon; in March, it sometimes sets weakly to the northward, with a kind of night and day winds, similar to land and sea breezes; ships should, therefore, after reaching the Basses in this month, continue to work round the east side of the island, if the winds are moderate, and the current not strong against them.

When they reach the easternmost part of the coast about Aganis, the winds and currents may be expected to be more favourable for getting to the northward than they are at the S.E. part of the coast about the Basses; and on the southern part of the Coromandel coast, a favourable current setting along shore to the northward, is almost certain in part of February and March, with light variable breezes for proceeding up the bay. If N.E. winds be encountered off the S. E. part of Ceylon, a ship may stand to the eastward into the open sea, where the wind will most probably become variable to north-west and westward.

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# COAST OF COROMANDEL,† FROM POINT CALYMERE TO MADRAS.

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From Ceylon towards Negapatam in the S.W. monsoon.

A SHIP being in 18 or 20 fathoms water, abreast of Point Pedro Shoal, and bound to Negapatam in the S.W. monsoon, should steer N.W. by N. 8 or 10 leagues, taking care to keep in soundings; if the water deepen after having run a few leagues to the northward of the head of the shoal, she ought to haul more to the westward, and keep in from 12 or 14 to 16 fathoms; for the wind often draws to West, or sometimes to W.N.W., with a strong current running to the northward, rendering it difficult to get near the land between Point Calymere and Negapatam, when a ship is far out in the offing. If passing in sight of the low land about Point Calymere, a large ship should not come under 6 or 7 fathoms towards the roof or shoal flat projecting from that

* Some ships after making several degrees of easting from the land about the Basses by the reckoning, have unexpectedly got sight of the island again.

† The whole extent of coast, from Point Calymere to Ballasore, is generally implied under this name, although it properly belongs only to the southern part; the coasts of Golconda and Orixa form the other parts to the northward.

point, and you will in this depth pass the point at the distance of 2½ or 3 leagues. Steer afterwards along the coast in 8 fathoms, which will lead outside the 3½ fathoms shoal, situated to the southward of Negapatam, and when the white house, which is about 5 miles to the southward of that place, bears West southerly, you are clear of its northern extreme, and may haul in for the road, and anchor in 5 or 5½ fathoms.

Calymere Point.

CALYMERE POINT, in lat. 10° 17′ N., lon. 79° 56′ E., is low, covered with coco-nut trees, and ought not to be approached under 5½ or 6 fathoms; the two pagodas, called Point Calymere Pagodas, in lat. 10° 22′ N., lon. 79° 58′ E., stand near each other, about a mile from the shore, and 6 or 7 miles to the N.N.E. of the southern extremity of the point. From these pagodas, the direction of the coast is about N. ½ W. to Negapatam, distance 20 miles; all the land in this space is low, and planted with coco-nut trees near the sea. In lat. 10° 28½′ N., about 6 miles to the northward of the two pagodas, there is a remarkably tall coco-nut tree by itself, and 3 miles farther, a *tuft* of the same trees much higher than the rest, which bears due West from the south end of Negapatam Shoal. In lat. 10° 36′ N., about 5 miles to the northward of the tuft of trees last mentioned, there is a clump of thick bushes, or small trees, a little elevated, which is the first thing seen in making the land from the S. Eastward; and it rises in the form of a saddle, when viewed from 17 or 18 fathoms water, 5 or 6 leagues off shore. This *saddle bush* is at a small distance from the sea, and about 1½ miles to the S.S.W. of a sand hill near the beach, which has on it some coco-nut trees, and bears due West from the north end of Negapatam Shoal; close to the sand hill, on the north side, a *white* house is perceived among the trees near the beach, which is also a mark for the north end of the shoal.

Negapatam Shoal.

NEGAPATAM SHOAL extends nearly North and South about 6½ or 7 miles, and is little more than two cables' lengths across on any part; it is composed of hard sand and stones, having from 24 feet on its south part to 19 feet at its north part. About mid-channel between it and the shore, the depths are from 3½ to 4½ fathoms, and 5 fathoms close to its inner edge. The south end of the shoal is distant from the beach about 3 miles, and the north end about 4 miles.

The depths close to the shoal on the outside are 6 and 7 fathoms; therefore a ship bound to the northward ought not to come under 7½ fathoms until to the northward of the sand hill and white house among the trees near the beach, or until Negapatam flagstaff, or the Black Pagoda, bear N.W. ½ W. or N.W. by W.; she may then haul in, over some knolls that lie near the head of the shoal, and if the flagstaff bear to the northward of N.W. ½ W., will have overfalls of 7 to 5 fathoms on them. From 21 feet water on the north point of the shoal, Negapatam Flagstaff bears N.W. distant 8 miles, and the sand hill West.

Negapatam Anchorage.

The common anchorage at Negapatam during the fair season is in 5 or 5½ fathoms, soft ground, with the flagstaff about West or W. by S., off shore 1½ or 2 miles. When the weather is unsettled, ships should anchor out in 6 or 7 fathoms, with the flagstaff W. ½ S., and the highest of the five Pagodas N.W. or N.W. ¼ N., good holding ground.

Refreshments.

Fresh provisions for present use may be obtained, with vegetables, fruit, and rice, but firewood is scarce. The watering place is at a great tank, about half a mile up the river; ships generally employ the country boats to bring off water, as it might be tedious and dangerous to use their own, on account of the surf, which breaks high on

Tides. the bar when there is any swell. The rise of tide on the springs is about 3 feet; high water about 5 hours on full and change of moon.

Negapatam. NEGAPATAM (the fort) is in lat. 10° 45½′ N., lon. 79° 55′ E., by the trigonometrical survey of General Lambton; the town lies to the northward of the fort, near the entrance of a little river capable of receiving small country vessels, which has a north and south entrance, the land between them being an island; the boats use the windward entrance in passing out, and the leeward one in returning, according to the monsoon.* A considerable trade is carried on at this place by small coasting vessels.

Black Pagoda. About 1½ miles N.N.W. from the fort stands the old *Black* Pagoda, which is one of the most conspicuous objects in approaching this part of the coast, the whole of it having a low drowned aspect when first seen from the offing, and is mostly a sandy, barren soil, planted with coco-nut trees in many places.

Nagore Five White Pagodas. NAGORE FIVE *WHITE* PAGODAS are in lat. 10° 49′ N., distant about 4 miles from Negapatam, or 3 miles from the *Black* Pagoda, the direction of the coast between them being nearly North. These *White* Pagodas are excellent sea-marks for distinguishing Nagore River, which is close to them on the north side, and where a great trade is carried on, in piece goods, rice, &c. There are 8 feet on the bar at high water during the springs; the rise of tide about 3 feet, and flows to 8¼ hours. Several vessels of 2 and 3 hundred tons burthen belong to this place, and are navigated by natives, who conduct them to the coast of Sumatra, Achen, Malacca Strait, and other parts on the east side the Bay of Bengal, where they have a constant trade. The anchorage in the road is 2 or 3 miles off the entrance of the river, in 5 or 6 fathoms, with the five *White* Pagodas W.S.W. or W. by S. The coast is low, and at times inundated near the mouth of the river.

(Margin notes: Tides. — Anchorage.)

Tranquebar, rivers adjacent. TRANQUEBAR, in lat. 11° 1′ N., lon. 79° 55′ E., bears North a little westerly from Nagore, distant about 4 leagues; between them lie several small rivers; that of Karical, about 1½ or 2 leagues from Tranquebar, may be known by a bushy tree near it; ships may anchor abreast this river in 5 or 6 fathoms, but the entrance is not easily perceived, being formed by a narrow point of sand extending along the coast; the opening is to the northward, nearly parallel to it, which is the case with most of the rivers hereabout. To the southward of Karical River, about a mile, is Coluncherry River; and between this and Nagore is Tiroomale River: the bars which occupy the mouths of these small rivers render them navigable only at high water by boats, or the small country vessels called chilingas. Tranquebar is easily known, by the Fort and houses having a neat appearance, and being generally very white.

Soundings. In coasting along from Negapatam to Tranquebar, the shore may be approached to 6 fathoms; the depths are 5 fathoms about 2 miles off, 7 fathoms about 3 miles, and 12 fathoms about 6 miles off shore. In passing the river at Tranquebar, a ship ought not to come under 6 or 7 fathoms, on account of a bank projecting to a small distance from the shore.

Coast from From Tranquebar, the coast extends nearly North, about 7 leagues, to the entrance

* There is reason to think the entrance of this river is liable to change, for it runs parallel to the shore nearly three-quarters of a mile, and not more than 100 yards from the sea, having between them only a low bank of sand. The proper entrance is at present to the northward of the town, and the bar is tolerably smooth in fine weather, when ships' boats may go over it into the river; but they cannot land anywhere else on account of the surf.

of Coleroon or Kolram river, and may be approached to 6 or 7 fathoms regular soundings, but 10 or 11 fathoms are good depths to preserve in coasting along. To the northward of Tranquebar at 2 leagues' distance lies the village Caverypatam, in lat. 11° 8′ N., close to the mouth of the river called New Cavery, and near it, two small pagodas stand at a little distance from the shore. Tranquebar to the northward.

The small River Tiroomale Washil, taking its name from a pagoda that is seen inland, is about 2 leagues to the northward of Caverypatam, having a bank stretching nearly a mile from its mouth; but as the depth in the approach to it gradually decreases, it is not dangerous. The land to the northward of this river is rather higher than the coast to the southward, which from Point Calymere is all very low, and only discerned from the offing by the trees and buildings. On the southern part of the coast, the bank of soundings is very flat to 20 fathoms about 5 miles off; but from 70 fathoms about 8 or 8½ leagues from the land, it has a steep declivity to no ground 100 fathoms. To the northward of Nagore, soundings do not extend so far out, the depths from thence being generally 40 or 45 fathoms about 5½ or 6 leagues off shore, and the bank shelves suddenly from 45 or 50 fathoms, to no ground. Bank of soundings.

COLEROON RIVER, in lat. 11° 22′ N., has within the entrance a small island with the Fort of Devicotta, and may be known in coming from the southward by the land terminating in a point on the south side the river, the direction of which being formerly North, from thence turns to N.N.W. and N.W. by N. about 3 leagues to Porto-Novo, forming a kind of bay. But the best mark to know this place is a thick plantation of trees near the sea, called Coleroon Wood, which is higher than the other land, and when first seen from sea, appears like a low level island, sloping towards each extreme. Inland are situated four remarkable buildings, called the Chalambaram Pagodas; when just touching the south part of Coleroon Wood they bear W. ¼ N., when on the middle of it they bear West, but will not be perceived if a ship is well in shore, until they open to the northward of the wood, bearing then W. by S. ½ S. Coleroon River and adjacent coast.

COLEROON SHOAL projects 4 or 5 miles from the entrance of the river, and stretching to the southward, joins the shore about the south part of Coleroon Wood; the inner part of it is dry at low water, and from 11 to 12 fathoms near the outer edge, it is steep to 3 or 4 fathoms. A large ship, in coasting along here, should not come under 15 fathoms in the night, nor under 12 or 13 fathoms in the day, toward this dangerous shoal.* When the southernmost of the Chalambaram Pagodas is on with the south part of Coleroon Wood, you are abreast the southern end of the shoal, which does not extend far out. When the two middle Pagodas are in one bearing W.S.W. and Porto-Novo flagstaff W. by N. ½ N., a ship will be in 12 fathoms near the north end of the shoal, which is here nearly 5 miles distant from the shore; but a ship bound into Porto-Novo should bring the flagstaff W. by N. ¼ N. when the two middle Chalambaram Pagodas are bearing W.S.W. ½ S., she will then be clear of the north end of the shoal, and may haul in for the Road: or if in 18 or 20 fathoms, she may haul in for it, when the flagstaff bears W.N.W. Coleroon Shoal. How to avoid it.

* H. M. S. Falmouth, standing in towards the shoal in the night, intending to tack in 12 fathoms, but missing stays, got into 4½ fathoms, and was obliged to anchor; the weather being moderate, they warped out in the morning and made sail. It may be observed, that the water shoals more suddenly in standing towards the shore about Coleroon, than at any other part of the coast. (See also remarks under Pondicherry, p. 591.)

Porto-Novo. PORTO-NOVO, in about lat. 11° 31′ N., and 3 leagues N.N.W. of Coleroon River, is a place of some trade, and the road affords good anchorage in southerly winds, being sheltered from these by Coleroon Shoal, which breaks the swell. Anchorage. Ships may anchor in 6 fathoms mud, good holding ground, with the southernmost of the four Chalambaram Pagodas S.W. $\frac{1}{4}$ W., and Porto-Novo flagstaff W. $\frac{1}{2}$ N., off shore 2 miles. The river is small, navigable only by boats and country vessels. Water is procured from a tank a little way up, but it is brackish and of a pernicious quality. There is an iron foundery here, the light from which it is thought may sometimes be mistaken for the light at Pondicherry.*

Cuddalore. CUDDALORE TOWN AND RIVER, in lat. 11° 43′ N., lon. 79° 50′ E., bears from Porto-Novo nearly N. by E. distant about 3 leagues; the coast is safe to approach to 7, 8, or 9 fathoms, from 2 to 3 miles off shore. A little to the northward of Porto-Novo begin white sand hills near the sea, which extend along shore, and from the offing appear like islands, being higher than the adjacent coast. The anchorage at Cuddalore is in 6, 7, or 8 fathoms good ground, with the bar of the river from W. to W.S.W., and the ruins of Fort St. David N.N.W. $\frac{1}{2}$ W., off shore $1\frac{1}{2}$ miles. The river is small, shut up by a bar at the entrance, and navigable only by boats. Water, fresh provisions, vegetables, fruits, and other refreshments are got at this place. The ruins of Fort St. David lie 2 or 3 miles to the northward of Cuddalore, from which a bank projects a little more than half a mile to seaward.

Coast from Cuddalore to Pondicherry. From Cuddalore to Pondicherry the coast extends about N.N.E. $\frac{1}{2}$ E. 5 leagues, being low and sandy near the sea, and may be approached with safety to 8 or 9 fathoms, the soundings decreasing regularly to 7 fathoms about 1 or $1\frac{1}{2}$ miles off shore. From 42 or 45 fathoms, about 6 leagues from the land, the bank has a sharp declivity to no soundings.

In coasting along from Point Calymere to Pondicherry, a ship may at discretion keep in soundings between 10 and 14 fathoms, except when passing Coleroon Shoal, she ought not to come under 13 or 14 fathoms.

Captain Driver, of the ship Clyde, states that he got into shoal soundings on a bank off Cuddalore; having on the 20th August, 1822, made the land off Porto-Novo, and steering occasionally N.N.E. along the coast, in 12 and 13 fathoms, shoaled suddenly to 5 fathoms, and had many casts from 5 to $6\frac{1}{2}$ fathoms, then hauled more off, and soon deepened. This he calls a shoal patch of sand off Cuddalore.

Pondicherry. PONDICHERRY, in lat. 11° 56′ N., lon. 79° 54′ E., or 1° 26′ West from Flagstaff Point, Trincomalee, by chronometers, is situated close to the sea, and easily distinguished by its numerous buildings, having an agreeable aspect, when viewed from seaward. To the N.W. of the town, on a long flat hill, there is a piece of remarkable black land at a small distance in the country, having on it a grove or tuft of trees, which is the first thing discerned in approaching this part of the coast, and is a good mark to know Pondicherry. There is a small river, into which the country boats and small vessels enter, when trading to this place. In the fair weather season, from the 1st of January to October, the common anchorage in the road is abreast the town in 7 or 8 fathoms, about three-quarters of a mile from it; small ships may moor in $5\frac{1}{2}$ or 6 fathoms; but during the season when stormy weather may be apprehended, it is prudent to anchor well out, in 12 or 14 fathoms, in what is called the outer road.

* See remarks on Pondicherry, p. 591.

The following information respecting the new light at Pondicherry is taken from the "*Annales Maritimes.*"

"A fixed light has been established here since 1st July, 1836. It is exhibited all night, is 89 feet above the level of the sea, and may be seen from a ship's poop, in clear weather, 16 or 17 miles." Light.

"During the N.E. monsoon, that is, from October to March, vessels arriving in the night may find good and convenient anchorage in 10 or 12 fathoms, with the light bearing by compass from West to W.N.W." Anchorage.

"During the S.W. monsoon, from March to October, bad weather is not to be apprehended, and vessels may then anchor at night in 6 or 7 fathoms, with the light bearing by compass from W. to W. to W. by N."

"The positions for anchoring, here recommended, are those which in the respective seasons will be found most convenient for communication with the shore."

"The light from the chimney of an iron foundery at Porto-Novo, 10 leagues to the southward, may sometimes be mistaken for the Pondicherry Light; an error which might be productive of very disastrous consequences. In clear weather the distinction between the two lights would be sufficiently obvious, from the foundery light changing its brilliancy at the time of feeding the furnaces; but in hazy weather this change might be attributed to the variable state of the atmosphere; in which case the soundings must determine the position of the ship. Lieut. Henry, of the French navy, when commanding the Isere, examined the bank of Coleroon with reference to the foundery at Porto-Novo, and states that, from its northern extreme in 4 fathoms, the chimney bears N. 59° W. by compass. The soundings, he continues, decrease rapidly on the Eastern and N. Eastern edge of the bank of Coleroon. In running down the coast from Pondicherry to Karikal, and keeping on the western side of the bank, he found the soundings to decrease at each cast of the lead, to 9, 8, 7, and 6 fathoms. The soundings on the contrary near Pondicherry decrease on approaching the shore in a much less rapid manner." Caution respecting the lights on the coast.

"A vessel from the southward and bound for Pondicherry, being in doubt respecting the light seen on the coast, should immediately be put under easy sail, and keeping in readiness to manœuvre, stand in shore when the wind will permit, and endeavour to make out the light. The lead should be kept constantly going in order to receive due warning when to stand off; this being especially necessary near Coleroon, where the water shoals suddenly."

"In crossing the Coleroon bank, the bottom is sandy and good for anchorage, should the wind from the sea not be too fresh. There is not sufficient depth of water on some parts of the bank for large ships, and although by bringing either light on the bearing before mentioned, N. 59° W., all danger is avoided as far as grounding is concerned; yet there would be reason to fear that if a ship was off Pondicherry, the wind would not permit her to lay up sufficiently soon for the road, particularly in the S.W. monsoon, and that she would find herself past it, or at least obliged to anchor too far to the northward, and in a position very inconvenient for receiving or discharging cargo, or for communicating with the shore." Coleroon Bank.

From Pondicherry to Sadras, in about lat. 12° 35′ N., the distance is 15 leagues, and the direction of the coast nearly N.N.E. $\frac{1}{4}$ E. The shore is in general low, with sand hills in some places fronting the sea; from 10 to 14 and 15 fathoms are good depths to keep, in sailing between these places. From 42 or 45 fathoms, about 5 or 6 leagues off shore, the bank shelves suddenly to no ground. The bottom is mostly sand or gravel in the offing. Coast to Sadras.

Conjimeer.

CONJIMEER, a small river, where there are some ruins of buildings, is distant about 4 leagues N.N.E. $\frac{1}{4}$ E. from Pondicherry; between them sand hills extend along the coast, and behind these, the black land from the back of Pondicherry, gradually decreasing, terminates about a mile to the southward of Conjimeer. Abreast of this place, the anchorage is good, in 6, 7, or 8 fathoms, about $1\frac{1}{2}$ or 2 miles off shore.

Alemparva.

ALEMPARVA, in lat. 11° 15′ N., bears nearly N.N.E. $\frac{1}{2}$ E. from Conjimeer, about $4\frac{1}{2}$ or 5 leagues; about 1 league beyond the latter, a thick wood and a village is perceived, from whence to the south point of Alemparva River, which projects a little into the sea, the coast is rather low; the north side of the river is covered with trees, and several small hills appear in the country.

Sadras.

SADRAS, in lat. 12° 31′ N., lon. 80° 13′ E., bears from the entrance of the small River Alemparva N.N.E. and N.N.E. $\frac{1}{2}$ E. $6\frac{1}{2}$ leagues; the coast between them is generally barren with some sand hills, and few trees appear till within 3 leagues of the former place, where is the southern extremity of a thick wood of Palmyra trees, extending about a league along shore to the northward. Abreast of this wood, the shore being more flat than to the northward or southward, a ship in passing it should edge out a little, into 11 or 12 fathoms. There is another wood, about 5 or 6 miles to the northward of the former, which appears to project in a point, when viewed from the southward. From abreast the south part of this wood, the flagstaff of Sadras may be perceived over the trees that hide the town, for this place is not easily discerned from the sea, on account of the trees with which it is surrounded. Two pagodas may be seen in passing, one to the southward, the other to the northward, but they are not very conspicuous. The entrance of the River Palar or Paliar, about $3\frac{1}{2}$ or 4 miles to the southward of Sadras, is contracted by a bar, or narrow ridge of sand, inside of which the river becomes of considerable width. This part of the coast is known from seaward by a ridge of hills inland, at the back of Sadras, some of which are very rugged, and this ridge is generally called the High Land of Sadras, or Sadras Hills. When the highest of these bears N.W. the town of Sadras is nearly abreast.

Coast from thence to Madras.

From Sadras to Madras, the coast, extending N. by E. and N. $\frac{1}{2}$ E., about 11 leagues, is generally low and woody near the sea, but inland there are high hills; in coasting along, from 12 to 17 or 20 fathoms are good depths to preserve: come not under 12 or 14 fathoms in a large ship, particularly in the night, when to the northward of the Seven Pagodas, on account of the reef of Tripaloor. On this part of the coast, the bank, as before, has a sudden declivity, from 40 to 45 fathoms sand or gravel, about 5 or 6 leagues off shore, to no ground.

About 3 or 4 miles off shore at Sadras, the depths are 9 and 10 fathoms, but to the northward of that place the coast becomes more steep, those depths being about 2 or 3 miles off.

To the northward of Sadras, about 7 miles, are the *Seven Moolivaram Pagodas*, not discernible except when well in with the land; two of them are near the sea, one of which, standing on a rock, is washed by it, and is now nearly destroyed, although this pagoda, *it is said*, formerly stood at a considerable distance inland, the sea having encroached greatly on the land; four of them are in the valley near the foot of the southernmost high land, and the other on its extreme point; the view of those in the valley is often intercepted by the woods, particularly when they bear to the westward.

From the Seven Pagodas to Covelong, or Covolam, the coast extends N. by E. a little

Easterly, about 3½ leagues ; between them a rocky shoal projects about a mile or more into the sea, and bears E.S.E. from the small hill of Tripaloor, known by being much nearer the shore than any of the others. This reef should have a proper berth in passing, for it appears to be steep to, as will appear by the following extract taken from the Rockingham's journal. Tripaloor Reef.

The Rockingham, 26th of May, 1776, at half-past 10 P.M., hauled in a little from 13½ to 12 fathoms, directly after had 11 fathoms, and steered N.N.E. ; next cast 10¼ fathoms, steered N.E., the next cast had 8½ fathoms, and in hauling out to the eastward the ship struck upon a rock and soon bilged ; had 6 fathoms under the bow, 6½ a little way a-head, 5½ under the stern, and 4¼ at the main chains. From the wreck observed lat. 12° 43′ N., two of the Seven Pagodas bearing S.W., and the extremes of the land from North to S. by W., off shore about 4 miles.* The Nancy, Captain Jamison, which anchored near us to assist in saving the treasure, had two cables cut by the foul ground ; and H. M. S. Sea-horse, near her, parted a cable.

ST. THOME, ST. THOMAS, or MILAPORE, in lat. 13° 1′ N., bearing from Covelong N. ½ E. about 4½ leagues, is a small town close to the sea, having near it a plantation of Palmyra trees; the inland country is hilly, and the northernmost hill, called Mount St. Thomas, in lat. 13° 0½′ N., about 4½ miles from the sea, is easily known in sailing along, being lower than the others, regular and sloping in its shape, crowned with a church ; there are other buildings and trees in its vicinity. St. Thomas.

From St. Thomas the coast stretches N. ½ E. nearly 4 miles to Madras, and is low towards the sea, but safe to approach to 9 or 10 fathoms ; between them a black Pagoda is seen in passing.

From Point Calymere to Madras the greatest part of the coast is lined with a sandy beach, having a great surf rolling in upon it during both monsoons, which renders it hazardous and imprudent to land at any time in a ship's boat. Along the whole extent of coast, on this side of the peninsula, to Bengal River, the country boats are peculiarly constructed for passing through the surf; being built without timbers, with their planks sewed together, they bend to its force, and are very easily repaired.

The whole of this coast, together with that of Malabar on the western side of the peninsula of Hindoostan, is at present subject to the British Government.

MADRAS, or FORT ST. GEORGE, is the principal settlement on the coast of Coromandel, and the seat of the superior governor and council. The town within the walls of the fort, where most of the Europeans dwell, is composed of neat and well-built houses, with flat terrace roofs. The Black Town, which is larger, lies to the northward at a small distance, inhabited by Hindoo Merchants, Moors, Armenians, Jews, &c., with some Europeans, who have not houses in the fort. A small river or canal extends around great part of the walls of the fortifications, adding considerably to the security of the place, which is deemed a very strong fortress. It is a place of great trade, and the coast, although sandy close to the sea, becomes fertile and of an agreeable aspect at a small Madras.

* The distance of 4 miles off shore is certainly not correct; for the bearings of the land denote the place where the Rockingham was wrecked to be much nearer to the shore than 4 miles. Her distance from it was probably not above 1½ or 2 miles.

Captain Barclay, of the ship Bulmer, in May, 1820, *is said* to have carried soundings of from 5 to 7 fathoms on a bank, in lat. 12° 26′ N., with Sadras Hills bearing W. by N., distant from the nearest shore about 10 miles : the same navigator is said to have had only 4, 5, and 6 fathoms on another bank, in lat. 12° 45′ or 12° 47′ N., and about 14 leagues off shore ; which seems almost incredible.

distance inland; the water is excellent, and plenty of all sorts of provisions may be procured for a fleet of ships, but firewood is scarce.

As the surf breaks very high on the beach, the country boats are employed on all occasions where communication with the shore is requisite. The boats belonging to the ships in the road frequently proceed to the *back* of the surf, where they anchor on the outside of it, and call the boats from the beach to carry on shore their passengers, &c.

A breakwater is in progress of construction for the protection of the landing-place at the distance of 300 yards from the shore, and a buoy is laid down on its south end bearing S.E. by E. ½ E. from the Master Attendant's flagstaff. It was the intention to place another buoy on its north end.

Caution. When the weather is unsettled with a heavy swell rolling in, the surf is often very high, rendering it dangerous for any of the country boats to pass to or from the shore; when this is the case, a *red and white chequered flag* is hoisted at the Master Attendant's flagstaff, to caution all persons against landing from ships, which should be carefully attended to, for *many* lives have been lost through the temerity of Europeans proceeding to pass through the surf in defiance of the admonitory signal.

The following signals are also made from the same place.*

Flag—White, with blue cross .......................Weather suspicious, prepare for sea.
—— Red, with swallow tail .......................Cut or slip.

After sunset, an approaching gale is indicated by three lights being hoisted; one at the flagstaff head, and one at each yard arm; and a gun is fired every five minutes.

Road and anchorage. The road is open to all winds excepting those that blow from the westward, off the land, and there is generally a swell tumbling in from seaward, making ships labour or roll considerably at times; they are also very liable to have their cables rubbed or cut through, by pieces of wrecks or lost anchors, there being many of the latter in the northern part of the road.† To the southward, where large ships moor, in 9, 10, or 11 fathoms, it is more clear, with less risk of injury to cables. The bottom in many places is stiff mud, from which it is sometimes difficult to extricate the anchors. To moor in 9 fathoms, with the flagstaff from N.W. ½ W. to W.N.W., is a good position for a large ship, where she will be about 2 miles from the shore; but ships having a cargo to discharge often moor in 8½ or 9 fathoms abreast the flagstaff, with it bearing West or W. by N. In the bad weather season it is prudent to anchor well out, and keep the ship ready to proceed to sea, should circumstances render this advisable: the gales generally commence at N.W., blowing strong from the land, with which ships can run off shore, before the wind veers to the N.E. and eastward, when it would be impossible to get out to sea.

Cautions during the stormy season.

From the beginning of October to the 10th or 15th December is considered the most dangerous season to remain in Madras Road, or at any of the other ports on this coast. Gales have also been known to happen in April and May,‡ notwithstanding which ships are found in Madras Road at all times, for these gales are not frequent,

* From the remarks of Mr. Sprent, master of H.M.S. Wellesley.

† Ships that moor or anchor under 9 fathoms, if it can be conveniently done, ought, with their boat, to sweep the bottom with a small line within the range of their cables, to discover if any anchors are in the way, whereby they might receive injury. I once recovered two lost anchors, by examining the ground close to the ship after we had moored.

‡ May 4th, 1811, H.M.S. Dover, the Chichester store-ship, and several other vessels, were driven from their anchors on shore and wrecked, in a violent storm at eastward, which beat in the doors of the houses, broke down the trees, and the flagstaff of the fort. An American ship went to sea at the commencement of the storm and received no injury.

and if a ship be kept in good condition for proceeding to sea, embracing the opportunity to weigh, cut, or slip, and run out on the first approach of a gale, there is probably little danger to be apprehended; but many ships, by remaining at anchor, have at various times been driven on shore.

One of the severest storms ever known at Madras, which destroyed nearly all the vegetation, &c., commenced from the northward 10th December, 1807, shifted to the N.E. and East, where it blew a hurricane, and then veered to S.E., raging with equal violence. Severe storm.

In the beginning, and during the strength of the N.E. monsoon, the current sets strong along the coast to the southward, sometimes $1\frac{1}{2}$ and 2 miles an hour in December, but abates in January. Currents.

During the S.W. monsoon, particularly in the early part of it, after the 1st of February, the current frequently runs equally strong to the northward, which makes it necessary for ships to fall in with the land to windward of the port to which they are bound: this caution ought not to be neglected by ships that sail indifferently upon a wind.

The Lushington, 6th February, 1811, made the land at Pulicat, and anchored in 7 fathoms, with the flagstaff N.W. by W., the current running strong to the northward; with sea-breezes scant at S.E., and land-breezes at S.W., she was two days getting to Madras. The Duncan, Madras, and Anna, also fell in with the land a little to the northward, 5th February, and did not reach Madras till the 7th at midnight.

Ships approaching Madras after the 1st of February ought, therefore, not to make the land to the northward, but endeavour to steer direct for it, or rather to make it bearing to the N. Westward, particularly if the wind be southerly. In the opposite season, from September to the 1st February, ships should endeavour to make the land a little to the northward, for many ships which made the land a little to the South of Madras in the N.E. monsoon, have been from one to two and three weeks gaining a few miles to the northward, and with the utmost difficulty reached the port. Variation at Madras, 2° E. (1836).

From Mr. Mc Kennie's plan of Madras Road, it appears that it is high water on full and change of the moon at 7h. 34m., and that the rise of tide at the springs is $3\frac{1}{2}$ feet nearly. The maximum velocity of the current he states to be 3 miles per hour. Tides.

The lighthouse, erected upon the Exchange, or Commercial Hall, to guide ships into the Road, or clear of Pulicat Shoal in the night, is 90 feet above the level of the sea, and may be seen about 5 leagues from the deck of a large ship, or nearly 7 leagues from the mast-head; the south part of Pulicat Shoal bears from it about N. by E. $\frac{3}{4}$ E. 13 miles, but to keep clear of the shoal, the light should bear to the westward of S.S.W. $\frac{1}{4}$ W. Lighthouse.

There is a new lighthouse in progress on the esplanade between Fort St. George and the town; it is intended to exhibit a revolving light.

At anchor in December, 1793, with the flagstaff of Madras Fort bearing West 2 miles, by mean of several day observations, I made it in lat. 13° 4′ 10″ N., and in May, 1795, I made it in 13° 4′ 12″ N. Captain P. Heywood's observations place it in lat. 13° 4′ N. Position of flagstaff and observatory.

Captain John Warren, of H. M. 33rd Regiment, Temporary Astronomer at Madras, in the absence of Mr. Goldingham, by 176 observations of the sun with circle and zenith sector, made the observatory in lat. 13° 4′ 5″ 30‴·7 N.: by 500 observations of 52 stars within 8° of the zenith, taken with the zenith sector, he made it in

lat. 13° 4′ 13″ 7‴ N.; the mean of which places the observatory in lat. 13° 4′ 9″ 23‴·8 N., by 676 observations, taken by Captain Warren.

| | |
|---|---|
| From Bombay Castle, in lon. 72° 55′ E. by measurement, the mean of 3 chronometers, made Madras Flagstaff in ........ | lon. 80° 16′ 45″ |
| By chronometers from Bombay, Capt. P. Heywood made Madras Flagstaff ........ | 80° 19′ 0″ |
| By chronometers from Bombay, Capt. C. C. Mc Intosh made ditto........ | 80° 20′ 0″ |
| | Mean 80° 18′ 35″ E. |
| Allowing Point de Galle in 80° 17′ E. by 2 chronometers, made ditto........ | 80° 18′ 54″ E. |
| By mean of 20 sets observations ☉ ☾ ✱ taken in the road, I made ditto........ | 80° 22′ 0″ |
| | True Mean 80° 19′ 10″ E. |

The observatory at Madras is 2′ 20″ W. from the church in the fort, and the latter is nearly on the meridian of the flagstaff, or very little to the westward of it.

In the report received from Madras, in 1824, on experiments and observations made for determining the length of the pendulum at the equator, and at Madras, in order to obtain the ellipticity of the earth, Mr. Goldingham fixes the observatory in lon. 80° 17′ 21″ E., which would place the fort in 80° 19′ 41″ E. The late General Lambton and Colonel Hodgson both fixed the observatory in lon. 80° 18′ 30″ E., but 80° 17′ 21″ E. is now adopted as the established longitude of that of Astronomical Zero of British India.

Lieutenant Raper, in his discussions of the longitudes, makes the following remarks respecting the position of Madras.

"Mr. Taylor, the present astronomer and the successor of Mr. Goldingham, in vol. 1 of the Madras Observations, gives 80° 15′ 57″ E., by moon culminating stars, as the longitude of the observatory, which position is adopted in the Nautical Almanac."

"Mr. Maclear, the Astronomer, at the Cape of Good Hope, by 70 corresponding observations of moon culminating stars, made at Madras and the Cape between the years 1834 and 1837, gives the result as 4h. 7m. 1s. 6, which added to 1h. 13m. 55s., the received longitude of the Cape observatory, makes the longitude of Madras 5h. 20m. 56s. 6, or 80° 14′ 9″ E. of Greenwich."

"Mr. Riddle, of Greenwich, from a great number of similar observations made at Greenwich, Edinburgh, and Cambridge, and compared with Mr. Taylor's, computed the longitude of Madras, and gives the mean result as 5h. 20m. 55s. 6, differing only 1s. from that deduced from the Cape."

Lieutenant Raper, therefore, adopts 5h. 20m. 56s., or 80° 14′ 0″ E., as the longitude of Madras observatory.

Chronometers. Vessels may ascertain the error of their chronometers, by noting the time of the flash from the 8 o'clock evening gun, which being also noted at the observatory, is given in Madras mean time from the master attendant's office the following morning. Too much reliance, however, should not be placed on this method, as the flash cannot at all times be distinctly seen at the observatory.

# COAST OF COROMANDEL FROM MADRAS TO THE NORTHWARD.

ENNORE,* a village in lat. 13° 14′ N., bears from Madras N. by E. ½ E., distant 3 leagues, and about 1¼ miles to the southward of the village stands Ennore House, close to the sea. Nearly a league to the northward of that house is situated the southern extremity of PULICAT SHOALS, bearing about E. S. E. from a thick tope of trees, which is the first to the northward of Ennore House, and may be known by two trees at its southern extremity separated from the rest. The sea generally breaks about 1½ miles from the shore, on the south part of the shoal or reef opposite the tope of trees, there being less water on this part than anywhere else. The most dangerous part of the reef is a place with 3 and 3½ fathoms hard sand, distant 3 miles from the southern part mentioned, where it breaks, and the same distance off the shore abreast, having 10 and 11 fathoms very near it on the outside. Ennore.

Between this three fathoms bank, and the southern part of the reef that breaks, there is an inner passage leading to Pulicat Road, which is known by a second tope of coconut trees about 1½ miles to the northward of the first already described; when the second tope bears W. ½ S., a ship may steer directly for it, until she get into 6 fathoms ooze and mud; she will then be about a mile from the shore, and may steer N. ½ W. in regular soundings to the road.† The flagstaff is near the middle entrance of the river, there being one to the southward and another to the northward. Large ships ought to pass outside, and if bound into Pulicat Road, should not come under 13 or 14 fathoms until the flagstaff is brought to bear W. by N., or W. by N. ½ N., they may then steer for it, and will not have less than 5½ or 6 fathoms sandy bottom, in crossing the northern tail of the reef. Inner Channel. Pulicat Road.

PULICAT ANCHORAGE is in 7 or 8 fathoms, from 1 to 2 miles off shore, abreast the flagstaff, which is in lat. 13° 25′ N., and 2¼ miles East from Madras flagstaff. Between Ennore House and Pulicat, the shore presents a regular convex front to the sea, and from Madras is low, abounding with trees to the southward of Ennore. Inland there is a high chain of mountains, called the high land of Pulicat, or Pulicat Hills, at the southern part having a small piece of table land, or hill, called the Kettle Bottom, which bears West from Pulicat flagstaff, W. ½ N. when on with the middle of the bank, and W. N. W. when on with Ennore House. In lat. 13° 23′ N., lon. 79° 38′ E., a little to the southward of the Kettle Bottom, there is a hill less elevated, called NAGGERY NOSE, remarkable by a small crooked knob on it, bent over to the southward, and resembling a horn. Pulicat Anchorage. Coast and Hills. Naggery Nose.

From Madras Road, to pass clear of the reef stretching along the coast from Ennore to Pulicat, the course is N.N.E., and the distance about 6 leagues to its outer edge, To clear the shoals.

* Called Trifoo and Natoor, in some old charts and directories.

† The greater part of this description of the Pulicat Shoals is taken from the survey of them by Mr. J. Goldingham, in 1792. The rise of tide at Pulicat is from 2½ to 3 feet on the springs; high water at 9½ hours.

about $3\frac{1}{2}$ miles off shore to the S. Eastward of Pulicat, directly opposite the third tope of trees northward of Ennore. At this part it is steep from 10 and 11 fathoms to 4 and $4\frac{1}{2}$ fathoms, and should not be approached under 12 or 13 fathoms in a large ship, neither ought the southern extremity of the reef to be borrowed on under these depths. In steering along the coast from Madras a ship ought not to shoal under 12 or 13 fathoms, particularly in the night, she ought to keep out in 16 or 17 fathoms when abreast of Pulicat Reef, and if the Light of Madras is discernible, it must bear to the westward of S.S.W. $\frac{1}{4}$ W. in passing those shoals. The depths are from 45 to 50 fathoms on the outer edge of the bank of soundings, about 3 or $3\frac{1}{4}$ leagues off shore, on this part of the coast, which is steep, and from 18 to 20 fathoms about 4 and $4\frac{1}{2}$ miles off shore. As the depths decrease suddenly from 18 to 15 and 11 fathoms, then to $4\frac{1}{2}$ or 4 fathoms on the edge of Pulicat Reef, the *hand lead* is of little use.

Coast from Pulicat to the northward.

ARMEGON RIVER, or DURASPATAM, in lat. 14° 1′ N., is small, and bears nearly N.N.W. from Pulicat, distant $11\frac{1}{2}$ or 12 leagues: about half-way between them, Point Pondy projects considerably into the sea, with a shoal surrounding it to the distance of about 2 miles.

Armegon Shoal.

ARMEGON SHOAL nearly joins to the shoal that fronts Point Pondy, its S.E. extremity bearing N.N.E. from that point, distant 2 leagues, and from thence it extends about N.W. by N., parallel to the coast 4 or $4\frac{1}{2}$ leagues, till opposite the entrance of Armegon River, its outer edge being 2 leagues distant from the shore: the depths on it are generally from $3\frac{1}{2}$ to $2\frac{1}{2}$ fathoms, but on its southern part, to the northward of Point Pondy, there are only $2\frac{1}{4}$ and 2 fathoms in some places, where it occasionally breaks. This shoal was examined in 1821, by Captain Maxfield, deputy Marine Surveyor at Bengal, who found the depths very near its outer edge usually from 7 or 8, to 9 and 10 fathoms, increasing quickly to 28 or 30 fathoms at 3 or 4 miles' distance from it, in steering to the N. Eastward. Between the inner edge of the shoal and the coast there is a space, from 3 to 4 miles wide, now called BLACKWOOD HARBOUR, with soundings from $4\frac{1}{2}$ fathoms near the shore, to 6 or 7 fathoms contiguous to the edge of the shoal, where ships might anchor with safety in the fair weather monsoon, near the entrance of Armegon River, by passing round the north end of the shoal with the hill bearing W. $\frac{1}{4}$ S.* But the hill, and also the coast, is frequently so obscured by haze, that the land seems always more distant than it really is; and many ships having got on the shoal without seeing land, induced them to think that this shoal was situated far out from the coast, and it got the name of the *London Bank.*

Directions.

A ship bound from Pulicat to the northward, and wishing to keep near the shore, may continue to steer along in 10 or 12 fathoms, and when abreast of Point Pondy, she ought not to come under 12 fathoms to give a berth to Armegon Shoal. Armegon Hill, in lat. 14° 2′ N., and $2\frac{1}{2}$ leagues West from the entrance of the river, is of regular form, detached from any other high land: if bound into Armegon Road, a ship ought to keep in 11 or 12 fathoms until the hill bear W. $\frac{1}{4}$ S., or on with the north grove at the entrance of the river, which will be seen from the poop, and the Kettle Bottom, *if visible,* will then bear S.W.; she may from hence steer direct for the hill, and will pass to the northward of the shoal in not less than 6 fathoms, until she anchor opposite the river in 5 or 6 fathoms, within 2 miles of the shore.

* There is also a narrow channel round the south end of the shoal, between it and the shoal that fronts Point Pondy, leading into Blackwood Harbour.

KISTNAPATAM, or KALITORE, bears from Armegon nearly North about 5 leagues; the coast between them is low, and may be approached to 6 fathoms; ships anchor abreast of Kistnapatam River in 5 or 6 fathoms. Between it and Armegon, there is a place called Cotapatam. From Kistnapatam a sand stretches along the coast to the northward, around Point Pennar, about 4 leagues' distance, called Shallinger sand, which projects about 3 or 4 miles from the shore, having regular soundings of 4 and 5 fathoms on its outer edge. Point Pennar, in lat. 14° 30′ N., formed on a part of the coast having a regular convexity to seaward, is not remarkable; near it there is a river. Kistnapatam. Coast adjacent. Point Pennar.

GONDEGAM, or GREAT GANJAM, in lat. 15° 20′ N., bears from Point Pennar about N. by W., distant 16 or 17 leagues; the coast between them is generally low, fronting the sea, and may be approached to 7 fathoms. About 5 leagues to the northward of Point Pennar, Divelan Village and River are situated, and 6 leagues farther the River Cerrara, where there is a village and a pagoda. Inland from this part of the coast there are hills, which may be seen at a considerable distance. The river Mussy, at Gondegam, is considered to bound the coast of Coromandel to the northward, beyond which the coast of Golconda begins, but the appellation of Coromandel is often applied to the whole of the coast, as that of Malabar is to the whole extent of coast on the western side of the peninsula. Coast to Gondegam.

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## COAST OF GOLCONDA.

MOOTAPILLY or MOTUPALLI, in lat. 15° 43′ N., lon. 80° 20′ E., and about 8 leagues to the N.N. Eastward of Gondegam, is a small village half a mile inland, not discernible from a ship; but with the assistance of a glass, a small pagoda is perceptible. There are about 20 detached Palmyra trees to the northward of the landing place, and about a mile to the southward, a thick grove of trees with a *clump* on its southern part higher than the rest. With the northern extremity of a piece of high land in one with a thick grove of trees, you are abreast the proper anchorage, in lat. 15° 42′ N. Mootapilly. Anchorage.

The Dundas, in 5 fathoms soft ground, at anchor in the road, off shore 1 mile, had the extremes of the land bearing from N.E. to S.W. ½ W., high land W. by S., and the pagoda at Mootapilly N.W. by N.

Coming from the south towards Mootapilly, a vessel may keep near the land in soundings between 6 and 8 fathoms, to pass inside of the 2½ fathoms shoal, situated on the extensive bank to the S.E. and eastward of Mootapilly now to be described.

MOOTAPILLY SHOAL was examined in 1816, by Captain Court, the Company's Marine Surveyor, who found the least water on it to be 2½ fathoms, which shoal patch is in lat. 15° 25½′ N., and 5 miles distant from the shore, Ongore Hill bearing from it West a little northerly, distant 10½ miles, and it lies S.W. from False Point Divy, about 6 leagues. Mootapilly Bank extends to several miles' distance all around the above-mentioned shoal, having in some places hard bottom with overfalls from Mootapilly Shoal and Bank. Coast opposite.

5 and $5\frac{1}{2}$ fathoms, to 8 and 9 fathoms water. Ships passing here in the night ought not to shoal under 24 or 20 fathoms, nor under 14 or 15 fathoms in the daytime, on the outer edge of the bank, which shelves off from 18 or 20 fathoms to no ground, 60 fathoms at $3\frac{1}{2}$ or 4 miles' distance. The shoal patch has from $5\frac{1}{2}$ to 8 fathoms near it all around, hard irregular soundings, which do not point out its proximity: several Bengal ships have accidentally got on it in $2\frac{1}{2}$ or 3 fathoms, and were in imminent danger.

From Mootapilly to False Point Divy, the coast runs N.E., then East about 6 leagues, and forms a bay to the westward of the latter point: in this space the coast is low and woody, having the villages of Pettahpilly and Nisampatam, with two small rivers near them; Pettahpilly, in lat. 15° 50′ N., is the westernmost of these, and may be known by a flat grove of Palmyra trees near it.

Divy False Point.

DIVY FALSE POINT, in lat. 15° 45′ N., projects from the main to the southward, forming the east side of Pettahpilly Bay, having the River Sippeler and other branches of the Kistna falling into the sea close to it, or in its vicinity. A bank of very shoal water projects from this point about 2 leagues, both to the westward and southward, requiring caution in passing, as the depths near its edge decrease rather suddenly in approaching from seaward, there being 35 and 40 fathoms, about $1\frac{1}{2}$ or 2 miles outside the edge of the bank that extends from False Point along the coast, and around Point Divy; but the depths, from 10 or 12 fathoms on the edge of the bank, decrease pretty regularly to 5 and $4\frac{1}{2}$ fathoms farther inside. Ships coming from Mootapilly ought to steer along the coast in from 6 to 8 fathoms until they approach False Point Divy; then haul out to the south-eastward, round the shoal flat that fronts it, which may be borrowed on to $4\frac{1}{2}$ or 5 fathoms during fine weather. The Dundas, in steering along the coast from Mootapilly towards Masulipatam, shoaled once to $4\frac{1}{2}$ fathoms on the flat projecting from the False Point, her distance from it then 6 or 7 miles.*

Divy Point and adjacent coast.

DIVY POINT, in lat. 15° $57\frac{1}{2}$′ N., lon. 81° $14\frac{1}{4}$′ E., by the trigonometrical survey, bears from the False Point N.E. by E., distant $5\frac{1}{2}$ or 6 leagues; the coast between them is low, with a shoal flat extending from it to the distance of 5 miles.† Point Divy is also environed by a continuation of the shoal flat, projecting from it to the southward and eastward above 5 or 6 miles, on which the sea breaks in some places; ships in passing may occasionally borrow on the flat to $5\frac{1}{2}$ or 6 fathoms with a commanding breeze, as the water shoals gradually; but suddenly in coming from seaward on the edge of the shoal. The point is low,‡ without any distinguishing mark, except some trees covering it; for the low level coast which stretches from it to the N.N. Westward, forming the west side of the semicircular bay of Masulipatam, is destitute of them.

Around the point, and between it and the former place, several branches of the

* The coast being very low, is scarcely seen in hazy weather from the outer edge of the shoal flat, upon which the corvette Favorite, and other ships, have grounded; but according to Captain Court's survey of this part of the coast, the edge of the flat bank, where 9 or 10 fathoms is laid down, from False Point to Point Divy, is only about 4 miles distant from the land.

† By Captain Court's plan of this locality, it is only $3\frac{1}{2}$ miles.

‡ To guide ships passing this point in the night, or in hauling round the shoal flat towards Masulipatam, a lighthouse erected on it would be of great utility; for all the adjacent coast being very low, there are no distinguishing landmarks visible to guide ships; even when they come into shoal water, the trees in many parts scarcely appear, as the flat extends far out from the low land.

River Kistna fall into the sea; the great quantity of earth carried from the land during the rains by these rivers has probably formed the shoal flats along this part of the coast.

The rise and fall of tide is seldom more than 4 or 5 feet in the springs, at the mouths of the rivers; but it sometimes happens, when a severe gale of wind blows from the sea, that the low land contiguous to it is inundated, causing great destruction of property and lives. Tides.

In approaching Point Divy from the eastward, the depths decrease quickly after a ship gets on the edge of soundings, about 5 leagues off shore; the lead ought, therefore, never to be neglected, when standing towards it, or any part of this low coast.

MASULIPATAM, in lat. 16° 10′ N., lon. 81°, or 54′ 54″ E. from Madras Observatory by chronometer, corresponding with the trigonometrical survey, bears nearly N. by W. ½ W. from Point Divy, distant about 12 or 13 miles; the coast between them is low and sandy, lined with a shoal flat, having 3½ and 4 fathoms on the edge of it, about 5 miles off shore. Masulipatam.

With a southerly or westerly wind, a ship bound into the road may, after bringing Point Divy to bear about West in 7 or 8 fathoms, steer along the edge of the flat, shoaling to 5 or 4½ fathoms gradually, as she approaches Masulipatam, which will easily be known after rounding the Point, by the appearance of the flagstaff and buildings; if she get into 4 fathoms, or have a hard cast, she ought to haul out instantly to the eastward. To sail into the road.

The shore is flat all round the bay, the depth in approaching it being not more than half a fathom for the distance of nearly a mile. Ships, in the fair season, generally anchor at Masulipatam abreast the town, in from 4 to 5 fathoms mud, with the flagstaff from West to W. by N., off shore 4 or 5 miles. This town is situated on a small branch of the River Kistna, and is a place of considerable trade; the export chiefly cottons, printed in a variety of patterns.

Ships bound to Masulipatam, from February to October, should make Point Divy, taking care not to fall to the northward; in coming from Madras they should keep in soundings, but to avoid the Armegon Shoal, and the Mootapilly Shoal, they ought not to borrow under 20 fathoms in passing, particularly in the night. When False Point Divy is approached, or the coast between it and the true point, they may, with the wind at S.W. or West, haul into 8 or 9 fathoms, decreasing the depth of water gradually when round the point, until they reach the road of Masulipatam. This proceeding is proper during the strength of the S.W. monsoon; but in February, March, and April, if the winds incline from S.E. or eastward, *which sometimes happens*, it will be prudent to keep at a reasonable distance from the land, and steer directly from seaward into the Bay at Masulipatam.

In October, November, and part of December, the weather is very unsettled, the winds generally from N.E. and East, and the current running mostly strong to the southward; therefore, ships bound into any of the ports on this coast during these months should fall in with the land to the northward of the place to which they are bound, for they will seldom be able to gain any northing when near the land in this season. As most of the roads on the coast are exposed to gales of wind from the sea, which are liable to happen from the 1st of October to the middle of December, or 1st of January, few ships remain in them during this period, except on particular occasions. From the 10th or 15th of October, to the 10th or 15th of December, is considered the most precarious time. Unsettled weather.

Gales of wind have at times been known to happen during the S.W. monsoon, particularly at its commencement in April or May: a storm has also been experienced in August, although bad weather is seldom apprehended when the S.W. monsoon prevails.*

Narsapour and adjacent coast.

NARSAPOUR, or NARSIPOUR POINT, in lat. 16° 20′ N., lon. 81° 46′ E., bears from Point Divy nearly N.E. by E. 12 leagues, and from Masulipatam E. by N. northerly, about 11 leagues; it forms the eastern extremity of the great bay formed between it and Masulipatam; and close to it on the west side, the river of Narsapour falls into the sea, which is the western branch of the Gadavery, the other branches of that river falling into the sea near Point Gordeware, and at Coringa. On the bar of Narsapour River there are 8 or 9 feet water, and 3, 4, or 5 fathoms inside, in the passage to the town: a shoal bank projects about 3 or 4 miles to the southward and westward of the river and point, on which the sands are liable to shift and alter the channel leading to the former. The anchorage in the road is in 4½, 5, or 5½ fathoms, to the westward of the point, near the edge of the flat that extends from the river off shore 4 or 5 miles. In a direct course from Point Divy, across the entrance of the bay to Narsapour, the depths are from 14 to 24 fathoms, shoaling fast towards either point.

From Narsapour Point, the coast stretches nearly N. E. by E. about 12 leagues, then changes to N.N.E. and North, 3½ or 4 leagues farther to Point Gordeware; the coast between them is low, and may be approached occasionally to 7 or 8 fathoms, but in a large ship it is prudent to keep farther out, particularly within 3 leagues of Point Gordeware, when she ought not to borrow under 14 or 15 fathoms in the night towards the extensive shoal that surrounds the point; between these points, some rivers fall into the sea.

Point Gordeware.

GORDEWARE, or GADAVERY POINT, in lat. 16° 48′ N., lon. 82° 17′ E., as stated by Mr. Topping, in his survey of Coringa Bay, is a low, narrow sand bank, extending nearly North and South several miles, the north end of it being considered as the point, though some navigators set the low islands on the west side of the sand bank for Point Gordeware, as these are covered with trees and bushes, but partly inundated at high water. The sands surrounding the point, on which the sea breaks, extend from it about 3 miles to the N.E. and northward, having channels for boats between some of them; one of them, called Hope Island, is a dry sand bank to the N.N.W. of the point, from 2 to 3 miles' distance, and 2½ or 3 miles within the eastern extremity of the reef, its north being in lat. 16° 51′ N.; to the northward of Hope Island, the bank consists of soft mud, where it fronts the sea, and the edge of this mud bank, having 2 and 3 fathoms on it, extends from the northern extremity of the reef, about W.N.W. and W. by N. to Coringa Road. A little to the westward of the edge of this bank, the bottom becomes hard sand, so shoal, that nearly the whole space between Coringa River and Point Gordeware Reefs is dry, or barely covered at low water. The James

Surrounding shoals.

* On the 9th and 10th of May, 1832, the coast of Coromandel was visited by a violent tempest, the wind chiefly blowing from N. to N.E. with a deluge of rain, which destroyed much property along the coast, and about Coringa. The sea inundated the low country, and by saturating the land with salt, poisoned the vegetation; several vessels were carried into the fields by the inundation, and afterwards grounded on more elevated parts of the land. One new ship, building on the stocks at Coringa, was swept away into the river and destroyed. In Cuttack, and the low country around Point Palmiras, a devastation of property, and loss of life, took place by the inundation, followed by famine, whereby multitudes of the natives perished, who escaped from the inundation.

Sibbald, a fine Bombay built ship, was wrecked on these reefs in 1832, on the voyage from Bengal to England. Captain Driver observes, that in August, 1824, working into Coringa Bay, in the ship Clyde, the soundings were found to be very irregular, frequently from 7 to 14 fathoms at each cast of the lead.

The principal branch of Gadavery River is to the N. Westward of Point Gordeware.

CORINGA BAY has been improved by the erection of a flagstaff lighthouse on Hope Island, to guide ships to the proper anchorage. Ships should anchor with the flagstaff on Hope Island bearing S. by E., the two pagodas at Jaggernautporam wide open, their centre N.W. by W., the large house at Coringa S.W. $\frac{1}{2}$ S., where they will have $4\frac{3}{4}$ fathoms at low water, soft ground. Or they may anchor in $5\frac{3}{4}$ fathoms at low water, with the flagstaff on Hope Island bearing S. $\frac{3}{4}$ E., Jaggernautporam two pagodas wide open, their centre N.W. by W. $\frac{1}{2}$ W., the large house at Coringa S.W. $\frac{1}{2}$ S. a little southerly, and Coringa River's mouth wide open, bearing S.W. Coringa Bay.

Ships of 500 to 600 tons may bring the flagstaff on Hope Island to bear S.S.E., Jaggernautporam two pagodas N.W. by W. well open, and the large house at Coringa S.S.W. $\frac{1}{2}$ W., the mouth of Coringa River S.W. $\frac{1}{2}$ S. well open, in 4 fathoms at low water, soft ground.

The country vessels generally anchor in 3 or $3\frac{1}{2}$ fathoms in Coringa Road, about $1\frac{1}{2}$ or 2 miles from the shore, with the two pagodas at Jaggernautporam, or the flagstaff, about N.N.W. to N.N.W. $\frac{1}{2}$ W., Hope Island S.S.E. $\frac{1}{2}$ E., if this low sandy island be visible, and then the bar off Coringa River will bear about S.W. by S. Here, they may be supplied with wood, water, and provisions; and in the fair season, any repairs wanting may be effected.

Coringa Town, in lat. 16° 49′ N. (the Company's House), is situated on the branch of Gadavery River, generally called Coringa River, and bearing from Gordeware Point W. by N., distant 6 miles. This is the best place on the coast for repairing or building small vessels, there being a considerable number of shipwrights and caulkers constantly employed building or repairing the numerous coasting traders which belong to, or frequent the river or road. On the bar of Coringa River there is from 12 to 14 feet over a sandy bottom in common spring tides: it is high water at 9 hours on full and change of moon, rise of tide from 4 to 6 feet on the springs, and $2\frac{1}{2}$ or 3 feet on neap tides; but when storms happen, or strong gales blow from sea, the country being low, is liable to inundations, the sea having been known to rise greatly above its ordinary level at such times. The water here, as well as in the road, is smooth, and outside the bar, the bottom being soft mud, it is common to see the country vessels aground in it. Coringa Town and River. Tides.

When over the bar, the leading mark up the river is a small tope of trees about 120 yards from the starboard shore, kept a-head about W. by S. $\frac{3}{4}$ S., until the river on the starboad side is open; a vessel should then steer to S. Westward, keeping nearest the starboard shore in passing to Coringa Town, which is situated on the southern shore, about a mile from the point that forms the entrance on the same side; the depths in the river, within the bar, are in general from $2\frac{1}{2}$ to 4 fathoms. Ingeram town is about 6 leagues up the river, from whence a considerable quantity of piece goods is exported.

Jaggernautporam, in lat. 16° 56′ N., about 7 miles nearly North from Coringa, is a village with some white buildings, and two small pagodas near it: on the bar at the entrance of the river, which is about a mile to the eastward of the village, there is a considerable surf, and it is scarcely navigable by boats at low water; inside the depths Jaggernautporam River and anchorage.

are from 4 to 7 or 8 feet, but this river being small, it is seldom frequented except by boats or donies. The anchorage in the road is abreast the river entrance, in 5 or 5½ fathoms soft mud, with the village bearing W. by N. or West, and Coringa flagstaff about S.S.W., off shore 1 or 1½ miles. Ships may at times obtain refreshments and water at this place.*

Approach to Point Gordeware.

To the S.E. and southward of Point Gordeware, the bank of soundings is steep, from 45 or 50 fathoms about 4 leagues off, to 16 or 18 fathoms in a run of 3 or 4 miles towards the shore; care is therefore requisite in the night, when approaching the point from seaward, as the depths decrease suddenly; a large ship ought not to come under 16 or 17 fathoms, and should be prepared to tack immediately after getting soundings. To the northward of the point the soundings are more regular, and do not decrease so suddenly as to the S.E. and southward.

Although the reefs surrounding Point Gordeware are dangerous to approach in the night or in thick weather, they may occasionally, with a gentle commanding breeze, be borrowed on in the day to 9 or 10 fathoms. The Marchioness of Exeter, 14th August, 1802, steered along the breakers, off the point in 7 and 8 fathoms, when the *False* Point bore S.S.W., and the *True* one W. by S. on with a white building; and she rounded the N.E. extremity of the breakers in 6 fathoms, distant half a mile, with the Pagodas at Jaggernautporam bearing about N.W. by W., which is certainly as close to them as a ship ought to venture.

To sail into Coringa Bay.

With a southerly wind, bound to the anchorage in Coringa Bay, a ship, after rounding the reef off Point Gordeware, may steer to the W. N. Westward along the edge of the mud bank in 6 or 7 fathoms, until she reach the road; or in working, with the wind from westward, she may borrow on the edge of it to these depths at tacking, but the soundings are not always regular. From the entrance of Jaggernautporam River, S.W. about 2¼ miles, and 2 miles from the nearest shore, there is a bank of 3½ and 4 fathoms hard ground that ought to be avoided in a large ship; between it and the shore the depths are from 4½ to 4 fathoms soft bottom, and the same to the southward, betwixt it and the edge of the mud bank, in a channel about three-quarters of a mile wide.

Bank with 3½ fathoms.

Large ships seldom anchor inside the 3½ fathoms bank mentioned above, except they are in want of careening or repairs; in such case, the best berth is to the southward of it, in 4 or 4½ fathoms in Coringa Road. A little to the northward of the entrance of Coringa River there is an inlet and a village where fresh water may be procured, and about half-way between it and Jaggernautporam are the three small pagodas of Solinga, with the entrance of another inlet or small river a little to the northward.

Wattara.

WATTARA, a small town, in lat. 17° 26′ N., bears from Point Gordeware N.E. by N., and from Jaggernautporam nearly N.E., distant about 15 leagues; the coast between them may be approached with safety to 12 or 14 fathoms about 2 or 3 miles off shore, being bold and clear of dangers: the edge of soundings is seldom distant above 4 leagues from the shore. The low coast of Golconda terminates about 6 leagues to the northward of Jaggernautporam, where a ridge of hills or high land begins, stretching from thence along near the sea to Ganjam.

Rocky Bank, doubtful.

ROCKY BANK, in lat. 17° 26′ N., lon. 85° 51′ E., discovered by His Majesty's

* Having our rudder injured in the Nancy during a gale, we put into the road of Jaggernautporam, where we remained from the 27th September to the 7th October, 1784, with the rudder on shore repairing, and sailed from thence on the last day mentioned.

ship Melville, Admiral Sir J. Gore, July 24th, 1832, when beating down the bay in blowing weather, upon which several casts of soundings were got from 23 to 45 fathoms, but no soil came up on the lead, which either came up bruised or the arming was displaced, indicating a rocky bottom. The circumstance of no soil having been brought up by the lead may, however, still leave it doubtful whether the lead did really strike the bottom.

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## COAST OF ORIXA.

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THE COAST OF ORIXA is said to commence to the southward of Wattara, extending from thence to the entrance of the River Hoogly; but the southern part of this coast is generally called the Circars, and the name Orixa used for that part farther to the northward. Coast of Orixa.

VIZAGAPATAM, in lat. 17° 42′ N., lon. 83° 26′ E., is distant about 10 leagues N. E. $\frac{1}{2}$ E. from Wattara; the coast between them is a little convex, with middling high land near the sea, bold and safe to approach to 14 or 15 fathoms, within 2 or 3 miles of the shore. Vizagapatam and adjacent coast.

Vizagapatam may be known by the bluff headland, called the Dolphin's Nose, which forms the S.W. point of the road, but it is obscured by the high land beyond it, when viewed from the offing at a considerable distance. About 4 leagues to the S. Westward is Pigeon Island, almost close to the shore, appearing like a small hummock, and not discernible until near it; the coast opposite this island is sandy and barren. When Pigeon Island bears about North 5 or 6 miles, the Dolphin's Nose may be plainly seen, and other hills around Vizagapatam; one of these, to the northward of the road, is called the Sugar Loaf, but the highest is several leagues inland from the town.

In the S.W. monsoon, the best berth for small vessels is close under the N.E. side of the Dolphin's Nose, in 6 fathoms sandy bottom, it being steep to. Large vessels, in the same season, may anchor in 8 or 9 fathoms mud and sand, with the Green Hill to the southward of the Dolphin's Nose bearing S.W., the Bar Battery N.W. by W., and the Sugar Loaf in one with Walltear House. Anchorage.

In the N.E. monsoon, it is prudent to anchor farther to the N. Eastward, in the same depths, with Walltear House on with the west side of the Sugar Loaf, and the top of Green Hill just open with the Dolphin's Nose; the flagstaff of the fort will then be nearly in one with the centre of the Middle Battery, and the mouth of the river open, where a ship will be in 8 fathoms sand and mud, off shore $1\frac{1}{2}$ or $1\frac{3}{4}$ miles; this is a good berth, and ships ought not to anchor farther to the northward: by anchoring farther out, in 11 or 12 fathoms, they are in danger of losing their anchors, the bottom being very stiff mud.

On the bar at the entrance of the river there is from 8 to 10 feet water, and sometimes more in the N.E. monsoon; but the sands are liable to shift, with a decrease of depth in the opposite monsoon. As the water shoals fast in standing into the road, sail should be reduced in time, before a ship is too near the shore. Abreast the Dol-

phin's Nose, at 2 or $2\frac{1}{2}$ miles' distance, the depths are 20 and 21 fathoms, with it bearing about N.W., and the shore continues equally steep from thence toward Pigeon Island; the bank of soundings hereabout extends $3\frac{1}{2}$ or 4 leagues from the land.

Bimlipatam and adjacent coast.

BIMLIPATAM, in lat. 17° 53′ N., bears N.E. about 5 leagues from Vizagapatam; the coast between them is bold, having 15 and 16 fathoms water within 2 or 3 miles of the shore. A hill projects in a headland on the south side of the river, and all the land near this place is high. Ships may anchor in from 6 to 8 or 9 fathoms, abreast the river and village, in the S.W. monsoon; and a little farther to the northward in the other monsoon.

Conara, or Santipilly Rocks.

From Bimlipatam the coast trends N.E. by N. 8 or 9 miles to Conor, or Conara River, and about 2 miles eastward from the River is Conara Point. Nearly opposite this point, in lat. 17° 58′ N., lies a dangerous ledge of rocks under water, not easily discerned, distant 5 or 6 miles from the shore, called CONARA, or SANTIPILLY ROCKS; close to them on the outside the depths are 16 and 17 fathoms, and a ship ought not to come under 17 or 18 fathoms in passing on that side.* Inside these rocks there is a safe channel, with 9 or 10 fathoms water near them, and 5 or 6 fathoms towards the shore; a ship in passing through it should keep nearly mid-channel, in 8 fathoms water.

Chicacole and Calingapatam Rivers.

CHICACOLE RIVER, in lat. 18° 12′ N., bears from Conara Point N.E. $\frac{1}{4}$ E., distant 6 or $6\frac{1}{2}$ leagues; the coast between them is high, and may be approached to 10 or 11 fathoms, about 2 or 3 miles off shore. About $4\frac{1}{2}$ leagues to the E.N. Eastward of Chicacole is CALINGAPATAM RIVER on the north side of a point of land, to which the coast may be approached into the same depths, and at the same distance as mentioned above. Ships may anchor at these places in 9 or 10 fathoms; there being little trade, they are seldom frequented.

Ganjam and adjacent coast.

GANJAM (the flagstaff), in lat. 19° 22′ N., lon. 85° 10′ E., by the observations of Captain P. Heywood, bears from Calingapatam River nearly N.E. by N., distant 26 leagues; the coast between them is high, and may be approached in general to 12 or 14 fathoms, about a league from the shore. In this space there are several small rivers and villages near the sea; that of Caletar, or Alatar, is $3\frac{1}{2}$ or 4 leagues to the N.E. of Calingapatam, and about 5 leagues farther is the River Pondy, or Poondy, having several rocks projecting from it a considerable distance to seaward. Over this place, some distance in the country, the land, called the High Land of Pondy, is high and uneven; along the coast it becomes of middling height, but equally uneven. Barwa, or Barva River, is about 5 leagues to the N. Eastward of Pondy, having several hills contiguous, which are not very remarkable. From this place to Ganjam the distance is about 12 leagues N.E.; in which space is the small River Sommaverom nearest to Barwa, and that of Carapar, with an oblong hill near it, 3 or 4 leagues from Ganjam. A little to the S. Westward of Carapar Hill, upon a woody and level piece of land, stands Monsoorcottah Pagoda, and the river of Carapar, or Monsoorcottah, is about 4 leagues to the S.W. of Ganjam, having a small fort at its entrance. When a scarcity prevails on the coast, ships carry rice from Bengal to this place.

At Ganjam a considerable trade is carried on, particularly by coasting vessels, many

* Great attention to the lead is necessary when in the proximity of these rocks in hazy weather, or in the night, for several ships have been lost, or greatly damaged, by running upon them, when borrowing too close, or by mistaking the distance from the land to be greater than the truth.

of which can enter the river, it being of considerable size. Ships may anchor in the road, abreast the fort or river entrance, in 8 or 9 fathoms, about 2 miles off shore. The bottom along this part of the coast is sometimes coarse sand or gravel, affording indifferent anchorage, and under 20 fathoms about 3 or 4 miles from the shore; the depths decrease suddenly in standing towards it. From Vizagapatam, the bank of soundings lining the coast has generally from 40 to 45 fathoms on the edge of it, about 4 or 5 leagues off shore, then a sudden declivity to no ground; from 20 to 30 fathoms are good depths to preserve in coasting along with a fair wind. Bank of soundings.

MANIKPATAM, in lat. 19° 40′ N., bears about N.E. by E. from Ganjam, distant 11 or 11½ leagues; the chain of mountains extending along the coast terminates in several saddle hills to the northward of the latter place, leaving between them and the shore a low level plain of reddish soil, where it fronts the sea. Ships, in coasting along, may approach the shore occasionally to 10 or 12 fathoms, but it is preferable to keep in from 16 to 20 fathoms. Manikpatam and adjacent coast.

Manikpatam is situated at the entrance of an inlet or small river, leading to the Great Chilka Lake, which is said to extend about 10 leagues along the coast; it may be known by a small Pagoda encompassed with other buildings, having near them some trees. From this place, a sand bank is said to project 2 miles, on which the water shoals suddenly from 10 to 4 fathoms; a ship ought, therefore, to avoid it in passing, by not coming under 11 or 12 fathoms.

From Manikpatam to the Jaggernaut Pagodas the coast extends about E.N.E. 5 or 6 leagues; but the pagodas being a little inland, bear from the former place nearly E.N.E. ½ N.: between them the coast is low with a sandy beach, and may be approached occasionally to 10 or 11 fathoms, about 2 or 2½ miles off shore.

THE JAGGERNAUT PAGODAS are three large circular buildings, surrounded by several smaller ones; they are of conical form, decreasing in diameter from their bases to their summits, which are crowned with white domes, and an ornamental globe or urn, and wind vane. The westernmost pagoda is the largest, and the eastern one the smallest of the three. They are all nearly in one bearing W. by N.; when brought to bear N.W. they begin to appear separated, when N.N.W. they are perceived to be distinct buildings, though when seen far off they seem connected. They are situated upon low land, well clothed with shrubs and small trees; and as many other white buildings stand near them, of diminutive size, in comparison with the largest pagoda, probably give an idea of its magnitude greater than the truth. This pagoda is in lat. 19° 48′ 21″ N., lon. 85° 54′ E.,* by chronometers and lunar observations. Jaggernaut Pagodas.

BLACK PAGODA, in lat. 19° 52′ N., lon. 86° 8′ E., stands also at a small distance from the sea, and bears from the Jaggernaut Pagodas N. 75° E., distant 14 miles; the coast between them is rather low, having a level and barren aspect, with a steep sandy beach, and may be approached to 10 or 12 fathoms; these depths being from 1½ to 3 miles off shore, but the soundings are not always regular. From 15 to 18 fathoms Black Pagoda.

* The longitude of this pagoda, 85° 45′ E., given in the former editions of the Directory, appears to have been a mistake, the bearing and distance of the Black Pagoda giving only 14 miles difference of longitude between them; this supposition is confirmed by a communication made to the Editor of the *Nautical Magazine*, in which Mr. Yates, the Master of the ship Lord Lowther, notices the error, and by his own observations places the Jaggernaut Pagoda in 85° 53′ 12″ E. (See *Nautical Magazine* for June, 1841.)

are good depths to preserve in coasting, about 4 or 5 miles off shore; but caution is requisite in the night, as *then*, the low coast is seldom seen, and if the lead be neglected, or *over hove*, a ship's proximity to the shore may be first discovered by the noise of the surf on the beach, which I have myself experienced.

When the Black Pagoda bears N.N.E. it appears like a high rock, rising abruptly at its east end, in shape of the gable end of a house, and a high pinnacle like a chimney projects upwards from its western end, from whence it gradually slopes down to the surface of the low land. There are three little clumps of trees or hummocks to the N.E. of it, and one to the S.W., which show their tops just above the white sand hills that form the sea coast. This pagoda being situated on even low reddish land, destitute of trees, and being of less diameter, and blacker than Jaggernaut Pagodas, may be easily distinguished from the latter. They may be seen 6 leagues in clear weather, and when first discerned resemble ships under sail, although in some views the Black Pagoda appears like a huge rock.

Coast to the N. Eastward of the Jaggernaut Pagodas.

From the Black Pagoda, the distance to the False Point is 16 or 17 leagues, and the course nearly N.E. by E.; but from this pagoda the coast extends $5\frac{1}{2}$ leagues about E.N.E. to the principal branch of the River Gonga, called also Cuttack River, from the large town of this name, situated on it at a considerable distance in the country. On this branch of the river, a flat of hard ground projects to seaward, on which the depth will decrease a little if a ship pass over the tail of it, but there is no danger if she keep 2 or 3 miles off shore, in from 12 to 14 fathoms; and in day-light it may, in fine weather, occasionally be approached to 10 fathoms. Near this place, other small branches of the Gonga fall into the sea, forming low islets, and this elbow, or projecting part of the coast, called Cojung Point, has sometimes been mistaken for the False Point, as the shore from it takes a northerly direction $2\frac{1}{2}$ or 3 miles, forming a *small* concavity in the land, nearly mid-way between the Black Pagoda and False Point, called Cojung Bay.* The whole of the coast is low to the N.E. part of this small bay, and from thence it stretches N.E. $\frac{1}{2}$ E. and N.E. by E. about 5 leagues to the False Point, very low land. From Cojung Point to False Point, the distance is about 8 or 9 leagues; the coast in this space may be approached to 10 or 11 fathoms in fine weather, or occasionally, when working in the day-time, or with the wind from the land, a ship may stand at times into 8 or 9 fathoms, about 2 miles from the shore, the soundings being most regular. Ships passing from the Black Pagoda to the False Point generally keep in 14 and 15 fathoms, which is preferable to borrowing nearer the land; particularly with unsettled weather in the night, or with the wind from seaward, it is prudent not to come under 13 or 14 fathoms. Between the Black Pagoda and False Point there are 40 and 45 fathoms on the edge of the bank of soundings, about 5 or 6 leagues off shore; near the point, soundings extend farther out.

To sail along it.

False Point.

FALSE POINT, in lat. 20° 20′ N., lon. 86° 59′ E., is low and woody, appearing like an island when seen from the S.E. or southward; Mahanuddy River separating it from the land on the west side, and the coast having previously a N. Easterly direction, turns sharp round at this point to N. by W., giving it an isolated appearance. In clear weather it may be seen from a large ship's deck at 5 leagues' distance, when she will then be in 15 fathoms.

The *Nautical Magazine for May*, 1841, gives an official notice, dated Fort William,

* Major Sackville states this concavity as very small, scarcely deserving the name of a bay; and he has not noticed it as such, in his excellent survey of Orixa, now deposited in the East India House. In the former charts of this coast, a bay, 3 leagues deep and 5 leagues wide, was *erroneously* delineated in this part.

April 21st, 1840, by which it appears that there is a new lighthouse on False Point, in lat. 20° 19′ 25″ N., lon. 86° 48′ 8″ E. The building is coloured red or reddish brown, with a large white star in the centre, and rises 120 feet above high water. The light may be seen 18 or 20 miles from a vessel's deck, elevated 12 or 15 feet above the sea. The old lighthouse on Point Palmiras has been undermined by the sea, and is in so ruinous a state that no dependence can be placed on seeing it. The notice recommends vessels not to come under 8 fathoms, for the purpose of making the lighthouse or light, and having made it, to deepen their water again from 13 to 18 fathoms, according to circumstances, on steering to the N.E. for the purpose of getting a pilot off Point Palmiras. It is also recommended, whenever the weather assumes a threatening appearance, and the wind inclined to the eastward, that vessels should keep a still greater offing, particularly late in the season, as they may expect the pilot vessels to do the same, and that these vessels will then be found nearer the tails of the reefs than Point Palmiras. New Lighthouse.

From False Point, a dry bank, with some shrubs on it, projects to the eastward, and then turns round to the northward in the form of a horse-shoe, into False Bay. The water is shoal round the point to a considerable distance beyond the dry bank, the depths being only 7 and 8 fathoms about 5 miles from False Point in a N.E. and Easterly direction, and at the distance of 3 miles in a southerly direction from it the same depths are found. The shoal bank surrounding this point seems safe to approach occasionally to 8 or 9 fathoms, as the decrease in depth is very regular. Working along the coast in the King George, we had the False Point bearing West at sun-set distant 3 leagues, then in 11 fathoms: from this time steering S.W. and S.W. by W. with a S.S.E. wind, the depth decreased very regularly over a bottom of soft mud to 9 fathoms, *then rather suddenly*, at 9 P.M., the helm was put down in 7 fathoms, and when about had only 6 fathoms: the False Point was then considered to bear about N.N.W., distant 3 miles; but it is certainly not prudent for any ship to stand into 7 fathoms hereabout, as we did in a large ship during the night. Shoal Bank.

From False Point, the coast extends 6 or 7 miles about N. by W. and North, then taking an E.N.E. and N.E. direction about 8 leagues to the True Point, or Point Palmiras; False Bay is formed to the northward of the former. This bay has all over it a soft bottom of green mud, with regular depths decreasing gradually to the shore; but at the northern part, the quality of the ground changes from soft mud to a mixture of sand and mud, with rotten stones and broken shells, on the southern edge of the extensive sand banks and reefs environing Point Palmiras. False Bay and the adjacent coast.

A little to the northward of False Point, two branches of the River Gonga fall into the sea, and farther to the northward, in the bottom of False Bay, are two sand hills; all the coast but these is low and woody.

POINT PALMIRAS,* in lat. 20° 41′ N., lon. 87° 11′ E., by selecting the mean of many observations taken by several careful navigators, by ⊙ ☾ ✱, and chronometers, bears from the False Point about N.E. by N., distant 8 leagues; but from being abreast the latter in 14 or 15 fathoms, with it bearing W.N.W., the direct course is N.E. and the distance 10 leagues to the outer edge of the bank off Point Palmiras in the same depth, with the point bearing W.N.W. Ships must be guided by the soundings in passing between them, as the flood sets *towards*, and the ebb *from* the shore; from 14 to 15 fathoms are good depths to preserve with a fair wind. Point Palmiras.

* Called by the natives Mypurra, from the contiguous sandy island of this name.

The land of Point Palmiras is low, and clothed with Palmyra trees, having on each side of it, at a small distance, the mouth of a river; that on the south side is navigable by boats or small vessels.

In rounding the bank off the point, the trees on the land are just discernible in 15 fathoms water, distant about 4 leagues from the shore; ships, therefore, seldom see the Point in passing, unless the weather be clear, and the reef approached under 14 or 15 fathoms, which ought never to be done in a large ship during thick weather, or in the night.

About a league E.N. Eastward of the Point lies the sandy Island of Mypurra, extending East and West nearly 2 miles, and half that breadth, generally called the island off Point Palmiras; it is situated on the N.E. part of the reef, and between it and the Point there is a channel navigable by small coasting vessels, with a sand in the middle, dry at low water.

Palmiras Bank or Reefs.

To the distance of 2 and 3 leagues, or rather farther in some places, Point Palmiras is encompassed with an extensive bank or shoal, composed of rocks and sands, on which the depths are very irregular in many places, varying between 1 and 4 fathoms. On the northern edge this bank is not steep as it is to the N.E. and Eastward, for on the north side of the island the water shoals gradually over a soft bottom until it is approached very close. The N. Eastern side of the bank is very dangerous, being steep from 10 to 4 and 3 fathoms, about 3 and 4 miles to the eastward of the island; were a ship here to get into 7 fathoms, she might be aground before another cast of the lead could be hove, and 14 or 15 fathoms abreast this part of the bank is not half a mile from its steep verge, where there are only $2\frac{1}{2}$, 3, and 4 fathoms rocks. On the eastern edge, with the Point bearing to the northward of West, it is not altogether so steep, the distance from 12 fathoms being about half a mile in standing on it to 4 fathoms; but even here it would be imprudent in a large ship to borrow under 14 or 15 fathoms in the night, or under 11 or 12 fathoms in fine weather during the day. On this part of the bank there is a reef of breakers about 4 miles E.S.E. of the Point, with others between it and the island, and rocks may be discerned at low water when the bank is rounded close.

With Mypurra Island bearing from S.W. $\frac{1}{2}$ W. to W.S.W., you are abreast of the most dangerous and steepest part of the reef, and when at the north-eastern edge of it in this part, the trees of Point Palmiras are just disappearing with the eye elevated 10 or 12 feet above the sea.

When Mypurra Island or Point Palmiras bears W. by N. 10 miles, just disappearing with the eye elevated 22 feet, you will have $11\frac{1}{2}$ or 12 fathoms, then distant 4 or 5 miles from the S.E. extremity of the reef.

When Mypurra Island bears W. $\frac{1}{2}$ S. $13\frac{1}{2}$ miles, just sinking in the horizon with the eye elevated 42 feet, you will have 14 fathoms, then distant 7 or 8 miles from the S.E. extremity of the reef.

The southern part of this bank is more flat than any other part of its exterior limit; for here the depths gradually decrease, and its limit on this side can only be known by the change of ground from soft mud in False Bay, to a mixture of coarse sand and mud, with rotten stones and broken shells upon the edge of the bank.

Caution in passing False Bay.

A ship passing False Bay in day-light, with a westerly wind, may steer along at discretion in 10 or 12 fathoms; but if she get into 9 fathoms and see Point Palmiras or the island off it, she ought instantly to haul out into 12 or 14 fathoms in rounding the eastern limit of the bank. When blowing strong from S.W. or Southward, a ship with day-light, after rounding the reef or bank off Point Palmiras, may haul to the

westward and anchor to the northward of Mypurra Island in 10 fathoms, or rather less water, where she will be sheltered by the reef until the force of the wind is abated. On this island a lighthouse was erected to guide ships round the reef in the S.W. monsoon when the weather is clear, but it would not be visible at other times from the outer edge of the reef. This lighthouse, it appears, has been undermined by the sea, and is now in so ruinous a state that no dependence should be placed on seeing it at all.* Lighthouse.

Mypurra Island is said to afford good water by digging into the sand.

In the official notice of 21st April, 1840, quoted from the *Nautical Magazine* at p. 608, it is further stated, that, " from the 15th March to the 15th of September, the pilot vessels will cruize, as formerly, during the day off Point Palmiras, in lat. 20° 42′ to 20° 48′ N., with the point bearing West to W. by S., and anchor usually during the night in a line East and West of each other, when the vessel, having on board the first-turn pilot, will burn a blue light and a maroon alternately every hour, commencing with the former at 8 o'clock, and continuing till day-light." Pilot Vessels.

" From the 15th of September to the 15th of March, the pilot vessels will cruize as before between Sagor Sand and the Western Sea reef."

KANNAKA, or KUNKA RIVER,† about 5 miles to the N.W. of Point Palmiras, and 2½ leagues to the westward of Mypurra Island, is wide at the entrance, but a long flat projects from it nearly 2 leagues to seaward, on which the depths are generally 2, 2½, and 3 fathoms. The depths within the entrance are nearly the same, and it appears that with a pilot vessels drawing under 12 or 13 feet may sail into the river at high water; it is much frequented by small vessels navigated by natives, who carry rice and other articles of trade from hence to Madras, and other places on the Coromandel coast, during the favourable monsoon. Kannaka River.

In Captain Sackville's survey, a small river, called Domrah River, is placed 10 miles to the northward of Mypurra.

At Point Palmiras, and the entrance of Kannaka River, it is high water about 9 or 9½ hours on full and change of moon; the rise of tide 10 or 12 feet on the springs, and 7 or 8 feet on the neaps. Tides.

CHURINGA RIVER, or Creek, bears from the entrance of Kannaka River nearly N.N.W., distant about 5½ or 6 leagues; the coast between them is low, and to the northward of Kannaka River, a flat, dry in some places at low water, extends about 4 miles from the shore; the depths towards the outer edge of it decreasing gradually to 2 fathoms. The Bay of Churinga, called also Kannaka Bay, affords good anchorage in the S.W. monsoon, to the N. Westward of Kannaka flat; but the shore is fronted by shoal water, there not being more than 3 fathoms at the distance of a league from it, and being out of the track of ships bound into Hoogly River, the anchorage under the island off Point Palmiras is preferable. Churinga River and adjacent coast.

At Churinga River the coast forms a curve, taking a direction from thence nearly N.N.E. ½ E., and N.E. by N. about 9 leagues to Bulramgurry, at the entrance of Ballasore River; between them there are other small rivers or creeks, and all the coast is low, with a flat stretching along it, on which the depths are not more than 2½ or 3 fathoms above a league from the land; and in some places the banks are dry at low water half a mile from the shore.

* See remarks under " False Point," p. 508.

† It is called Mypurra River in Major Sackville's survey of Orixa.

Ballasore River.

BALLASORE RIVER, the entrance, is in lat. 21° 28′ N., and very little to the eastward of the meridian of Point Palmiras. From the Point, all the low coast is planted with trees until within 2 or 3 miles of the entrance of this river, which on both sides is destitute of them, having a sandy barren aspect; by this it may be known, particularly by the small sand hills on the N.E. side. When the Nilgur Hills, situated inland to the westward, are seen, they answer as a good mark for a ship having occasion to proceed to the anchorage. With the extremity of the southernmost or Long Hill W. ½ S., the peak of the middle one appearing highest and separated from the others W.N.W. or W. by N. ¾ N., the smallest to the N. Eastward bearing N.W. by N., a ship will have a good berth in 5 fathoms mud, with the entrance of the river about N. by W. off shore 5 or 6 miles. The bank here is very flat, the depths being 2½ and 3 fathoms about 4 miles from the land. From the anchorage in 5 fathoms the peak of the Nilgur Hills bears W.N.W., distant 19 miles; and from Balramgurry, at the river's entrance, it bears W. ½ N., distant 14 miles.

Anchorage in the road.

A boat proceeding for Ballasore River should carry a compass, and in crossing the bar, ought to bring the flagstaff at Bulramgurry, or the Banks-hall house N.N.W.; keeping it on this bearing will lead her to the outer beacons, which are poles placed on each side the entrance of the bar. From hence, the channel lies directly towards the S.W. point of the opening of the river, where the passage is marked out by beacons or poles on each side, placed at convenient distances on the extremities of the shoals. At full and change of moon, it is high water about 10 o'clock, and the tide rises from 12 to 15 feet in common springs; but there is not more than 2 or 3 feet on the bar at low war in the dry season; it is, therefore, proper, not to attempt to pass over until the last quarter flood, for the sea breaks high upon it during the first quarter flood, particularly in the S.W. monsoon.

Description of the river.

Peply River.

PEPLY RIVER, or Creek, bears E. by N. from the entrance of Ballasore River, distant about 6 leagues; it is known by a Pagoda on the west side of the creek, having near it a tope of trees. Small vessels passing between these places may steer along the coast in 4 fathoms, about 2 or 3 miles from the shore, and when the Pagoda bears North, they may haul in near the entrance of the creek, where there is 2 fathoms at low water between it and the sand. Peply Sand stretches directly south from the east part of the creek, into 8 fathoms, distant about 3 leagues from the shore, having 7 fathoms close to, and 3 fathoms on its outer part, but is nearly dry at low water about 4 miles off the land. A ship intending to anchor in Peply Road, to the eastward of the sand, ought to steer round its southern end in 8 or 9 fathoms, and when the Pagoda is brought to bear N.N.W. she may begin to haul up to the N. Eastward, on the east side of the sand, and anchor with the Pagoda bearing N.W. by N., in 5 fathoms water.

Peply Sand.

Coast to Ingellee.

From Peply River, the distance is about 5½ leagues nearly E. by N. ½ N. to Beercool Creek, and from thence to Ingellee, in about lat. 21° 48′ N., the direction of the coast is first E.N.E., then about N.E.; the whole of it is low, and interspersed with sand hills. The small trading vessels from Ballasore keep close along the coast between Peply and Ingellèe, in a little channel, with 2 or 3 fathoms in it at low water formed between the sands and the shore.

Ballasore Road.

BALLASORE ROAD, which is the name generally given to the extensive bay, formed between Point Palmiras and the S. Westernmost banks, at the entrance of the River Hoogly, affords good anchorage, the bottom being mostly stiff blue clay, inter-

mixed with sand at times, or small stones. With Mypurra Island off the point, bearing about S.W., there is a spot of bright yellow clay like ochre, which is well in towards the land.

During unsettled weather in the S.W. monsoon, it may frequently happen that a ship cannot round the reef off Point Palmiras so near as intended, to enable her to anchor on the north side of it in smooth water; in such case she ought, when round the reef, to haul to the N. Westward into 15 or 14 fathoms, and anchor. Here, ships ride easier and more safe than farther to the eastward; being in deep water, the sea runs fair, whereas, it runs high and short about the sea reefs, and in the channels between them, with stronger tides than in the road. Anchorage.

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# ENTRANCE OF THE HOOGLY OR CALCUTTA RIVER.

## SANDS, REEFS, AND ISLANDS.

PEPLY SAND, already described, is the westernmost of the numerous banks that project to seaward, from the entrance of Hoogly River. Peply Sand.

THE WESTERN BRACE begins about 4 leagues to the N.E. of Peply, and 2 or 3 miles from the shore, from whence it extends 7 leagues nearly S. by E. to about lat. 21° 10′ N. On the north part it is very shoal, and about 4 miles broad, but becomes more contracted in every other part; from $2\frac{1}{2}$ or 3 fathoms at low water about the middle of it, the depths gradually increase to 7 or 8 fathoms on its southern extremity, where it is insensibly lost in 9 fathoms soft ground. The south end of Peply Sand is directly West from the middle of the Western Brace, distant about 3 leagues, with 7 and 8 fathoms soft ground between them, shoaling on the edge of the latter to 5 and $4\frac{1}{2}$ fathoms. Western Brace.

THE EASTERN BRACE is about 2 leagues to the eastward of the former, having on it about 1 fathom less water, and about half-way between their northern parts there is another shoal, with $1\frac{1}{2}$ fathoms on it at low water, and from 4 to 5 fathoms on its southern extreme, in about lat. 21° 22′ N. This shoal seems of *recent formation*, not being delineated in the charts, although upwards of 2 leagues in extent nearly North and South. Between the north end of it and the shore, and on each side between it and the braces, there are channels with 3 and 4 fathoms ending in the Kell. This is a swatch of soft ground, about 4 miles broad, formed between the braces, with the shoal last mentioned to the northward. The bottom in the Kell is generally very stiff clay, the depths from 5 to 7 fathoms at low water. The Western Sea Reef being a continuation of the Eastern Brace, they may be considered as the same sand. Eastern Brace. The Kell.

THE BARABULLA, and another parallel sand, begin at the north end of the Eastern Brace, from whence they stretch northward nearly to Ingellee, having very shoal water on them, and $2\frac{1}{2}$ or 3 fathoms in a channel that divides them, the Barabulla being the easternmost of the two, and forms the west side of the *old* channel called the Fair Way. Barabulla.

Long Sand.

THE LONG SAND forms the east side of the same channel, extending from about lat. 21° 15′ N., to the northward of Ingellee, being about 11 leagues in length, of various breadth, with many patches on it that dry at low water. The southern part of it is flat, having 5 and 6 fathoms regular depths, and on each side of this extremity they are nearly the same.

Gasper Sand.

GASPER SAND, the most extensive of any in the entrance of Hoogly River, stretches from near Mud Point, in lat. 21° 57′ N., about S. by W., and this upper part, generally called the Mizen, is broad and very shoal. It *formerly* occupied nearly the whole of the river in this place, leaving only a small passage along the eastern shore, and the proper channel for large ships was near the western shore, where the Europe ships used to moor in 6 and 7 fathoms close to the land at Kedgree; but between this place and the eastern shore there are *now* two other sands beside the Mizen, separated by channels of considerable breadth. The westernmost of these is Kedgree Sand, situated in the place where large ships formerly used to moor in 5, 6, and 7 fathoms, although that road is now nearly filled up by the sand, having not more than 2 and 2½ fathoms on it at low water.

Sagor Road.

To the southward of the Mizen, Gasper Sand is very narrow; here, ships cross over a gap in it when passing from Sagor Road to the proper channel leading up the river. In Sagor Road, the depths are 6 and 7 fathoms: it affords the best anchorage of any place near the entrance of the river, although not very safe during stormy weather, the tides running strong on the springs. This road is formed between Sagor Island and Gasper Sand, which here properly bears that name; and opposite to the S.W. end of Sagor Island it bends to the S.S. Eastward, terminating in the upper end of the Eastern Sea Reef, which is a continuation of it, and extends to lat. 20° 58′ N. The eastern edge of the Long Sand nearly joins to the S.W. part of Gasper Sand; and another dangerous sand, nearly dry at low water in some parts, lies at a small distance from the latter, but generally considered as the tail of the Gasper, and is 3 leagues South from the S.W. end of Sagor Island. Directly abreast of this a narrow spit called Sagor Middle Ground begins, and stretches a considerable way to the southward: between this and the former, about 20 years ago, was the proper channel for ships, but this is now nearly filled up, and another channel has opened to the westward, between the tail and the body of that sand, at present used by all ships entering the river through Sagor Channel; and this new passage through the Gasper Sand has been named THORNHILL CHANNEL.

Contiguous Sands.

Thornhill Channel.

Western Sea Reef.

THE WESTERN SEA REEF is a continuation of the Eastern Brace, extending nearly S.S.E., to lat. 20° 59′ N., and bending more to the S. Eastward near its southern end. It is in general about 4 miles broad, the depths at low water 2 fathoms on the north part, where it bears the name of Eastern Brace, deepening gradually to 3 on the middle part, and to 4 fathoms farther southward. On the southern extremity, or tail of this reef, the depths are 6 and 7 fathoms, with 10 and 12 fathoms near it on the west side, and 9 or 10 fathoms to the eastward, between it and the tail of the Eastern Sea Reef.

Eastern Sea Reef.

THE EASTERN SEA REEF, being a continuation of Gasper Sand, extends about S.S.E. to lat. 20° 58′ or 20° 59′ N., the tail of this reef being nearly on the same parallel as that of the former, and are distant from each other 8 or 9 miles. This reef is not so broad as the other, but the depths on it are similar, generally 2 fathoms

at low water, from the northern part, where it joins Gasper Sand, for a great way to the southward, then gradually deepening to the southern extremity, where on the tail of it there is 6 or $6\frac{1}{2}$ fathoms at low water. These two banks are the principal guides for directing ships into Sagor Channel, now in general use; the passage over the Braces into the Western or *Old* Channel, generally called the Fairway, being almost exploded. The sands having greatly augmented, with a considerable decrease of depth in the Western Channel, the navigation there has become dangerous; pilots, therefore, do not take ships into the river by that channel, unless they draw under 15 or 16 feet water.

The Sea Reefs are both steep towards their western edges, but the water shoals gradually, though quick, on their eastern sides; in approaching them from sea, the depths decrease regularly over a bottom of soft mud, and the bottom is of the same quality in the channels between them.

Upon the Sea Reefs, the bottom is hard sand, with bright specks like steel filings; and on the ebb tide, or near low water, the lead rebounds from it similar to striking on a rock.

The difference in depth between high and low water on them at spring tides is generally about 10 or 11 feet; and the water is highest over the ground, upon the Sea Reefs, and in Ballasore Road, about 9 or $9\frac{1}{4}$ hours on full and change of moon. Tides.

At anchor, on the tail of the Eastern Sea Reef in 6 fathoms, observed lat. 21° 2′ N.; and I measured $9\frac{1}{2}$ miles West from Calcutta by chronometers, which would place the tail of this Sea Reef in lon. 88° 11′ 22″ E., allowing Calcutta in lon. 88° 21′ 12″ E., agreeably to late astronomical observations.* Position.

Colonel Hodgson, Surveyor-general of India, by mean of 93 culminations of the moon's preceding limb, and 90 of the succeeding limb, made the Flagstaff of Fort William in lon. 88° 20′ 17″ E. Captain Ross, Marine Surveyor-general, places it in 88° 21′ 10″ E. Colonel Colebrook, late Surveyor-general, made it in 88° 21′ 50″ E. Mr. Goldenham, late astronomer at Madras, made it in 88° 21′ 30″ E. I made the latitude of Calcutta 22° $34\frac{1}{2}$′ N., by meridian altitude of the sun reflected in water.

About 7 or 8 leagues to the southward of the tails of the Sea Reefs, the depths are from 50 to 60 fathoms on the outer edge of soundings; from thence, the decrease is regular over a bottom of soft mud, to 9 and 10 fathoms close to their tails; and sudden to 6 and 7 fathoms hard ground upon them.

On the east side the tail of the Eastern Sea Reef, in lat. 21° 0′ N., to 21° 4′ N., the depths are generally about $8\frac{1}{2}$ and 9 fathoms at low water, and 10 or $10\frac{1}{2}$ fathoms at high water, in the entrance of Sagor Channel.

SAGOR SAND extends from the S.E. part of Sagor Island about S. by E., afterwards S.S.E., in a parallel direction to the Eastern Sea Reef; it is very dangerous, with patches dry at low water towards the land, and there is not more than 5 or 6 feet on it at low water, for a great distance to the southward. The tail of this sand, in former charts, was placed in lat. 21° 15′ N., but it is *now* considered dangerous at low water about that latitude, and seems to have increased in length, for the tail of it, at *present*, terminates in a narrow point, in lat. 21° 0′ N., where the depth is 9 fathoms. From its southern extremity, the depths decrease gradually to the northward on Sagor Sand, as on the Sea Reefs; the quality of bottom is also similar, hard sand mixed Sagor Sand.

* It was formerly thought to be situated more to the eastward, for the Reverend William Smith made it in lon. 88° 28′: Mr. Magee made it in 88° 24′, and Captain Ritchie made it in 88° 26′ E.

with bright specks like steel filings, but Sagor Sand is rather of a darker colour. This sand is nearly steep to on both sides, and the breadth of the channel between it at the Eastern Sea Reef is in general about 5 miles.

As Sagor Sand extends farther to the southward than formerly represented, many ships coming from the eastward in the N.E. monsoon mistake the hard soundings they get on it for the soundings of the Eastern Sea Reef, and work up in the entrance of Lacam Channel, on the east side of the former sand, until the clump of trees on the Lighthouse Point is seen; they then discover that they are to the eastward of Sagor Sand, instead of being on the west side of it in Sagor Channel, as they had previously supposed.

Sagor Sand may be considered as the *third* reef that extends far out into the sea; the Western Sea Reef being considered as the 1st, the Eastern Sea Reef as the 2nd, and Sagor Sand as the 3rd reef.

Sagor Island.

SAGOR, or SAUGER ISLAND, extends N.N.W. from lat. 21° 34′ N., to 21° 41½′ N., and bounds the great entrance of the River Hoogly on the east side, being 7 or 8 miles in length, and about half that breadth; near the east side of it there is a small elevation, but, like all the land hereabout, it is generally low.

Tides.

The creek that separates it from the other land is nearly dry at low water at the north end; there the rise and fall of the tide on the springs is about 4 fathoms, which is greater than at any other place about the head of the bay.

There is an ancient pagoda and a large tank of fresh water on the east side of the island, held in great veneration by the Hindoos, who go there in great numbers once every year to sacrifice. The Brahmins call the Island Gongo-Sagor, but the natives generally understand Gongo-Sagor to be the whole of the land that separates Channel Creek from the great western branch of Hoogly River, except the small island contiguous to the north end of Sagor, called Coxe's Island, which is nearly a league in length, two miles broad, and bounds the N.E. side of Sagor Road.

Edmonstone Island.

EDMONSTONE ISLAND is in about lat. 21° 32′ N., lon. 88° 20′ E.; from a mere half tide sand-bank, this alluvial phenomenon rapidly became an island of 2 miles in length, and half a mile in breadth, covered with shrubs, and affording a supply of fresh water in 1817, when a tripod was erected on it as a sea-mark for ships; and it was adopted as a marine station in 1820, where a pilot resided to afford assistance to ships approaching the channels which might happen to be in distress or requiring aid. In May, 1825, a substantial house was built on the island, but it was destroyed by the gales and uncommon rise of the sea in May, 1830, and May, 1833, which separated the island into two parts; the tripod, which had been erected on the centre of the island, then stood out into the sea. It is remarkable that the demolition of this island by the encroachment of the sea has been equally rapid as its formation; for it became necessary to abandon it as a pilot look-out station in January, 1831, and there is not *now* a particle of vegetation on it, the sea nearly covering it at high tides in the S.W. monsoon.

Codjee Deep and the adjoining harbour.

CODJEE DEEP,* in lat. 21° 26′ N., about 18 miles E.S.E. from the south end of Sagor, and 9 miles in the same direction from Lighthouse Point, distant about 4 or 5 miles from the nearest shore, is a small island, scarcely a mile in diameter. To the

* Deep, or Diva, an Island.

northward of this little island there is an excellent road, called *Hicks's Basin*, which is the best harbour on the coast of Bengal; and the anchorage in it is from 5 to 6 and 7 fathoms mud. N.N.W. from the island is the entrance of Subtermooky River, and N.N.E. from it that of Jumerah, having 6 and 7 fathoms water near them at the upper part of the harbour. The best channel leading to it, and to both rivers, is on the west side of Codjee Deep, bounded on the east side by that island, and a flat that projects from it a great way to S.S. Eastward; and on the west side by the extensive flat which stretches from Lighthouse Point to S.E. and Eastward, separating it from Lacam's Channel. This channel leading to the harbour, by some called *Howe's Channel*, is at Codjee Deep about 2 miles wide, with 10 fathoms in it nearly close to the island; to seaward the depths decrease gradually to 4 and 3½ fathoms, which is the least at low water. To the N. Westward of the island, upon the flat that bounds the west side of the channel, there is a sand dry at low water, and at other times of the tide the sea breaks over it in strong southerly gales. A little farther to the N.N.W., at the entrance of the Subtermooky River, is King's Island, under which ships may anchor in 6 or 7 fathoms, at the N.W. angle of the harbour, sheltered from all winds. The great Flat and sands on the west side secure it from the sea in that direction, and the island and Bulcherry Flats break off the sea to the southward and eastward.

To sail into the harbour a ship should bring the Island Codjee Deep to bear North a little easterly, then steer directly in clear of the west side of the island, which is steep to, and the channel about 2 miles wide; from hence she may, if blowing strong at S.W., steer about N. by W. to the anchorage under King's Island.

## ENTRANCE CHANNELS.

THE CHANNELS at present navigable into the River Hoogly are, first, the INSIDE CHANNEL, stretching from Ballasore close along the shore to Kedgree, inside of, or to the north-westward of all the shoals, with depths in it generally from 2 to 3 fathoms at low water; this is used by the small coasting vessels, which are navigated by the natives, and draw little water. Inside Channel.

FAIRWAY, or WESTERN CHANNEL, bounded on the east side by the Long Sand, and beyond its extremity, by the tail of the Eastern Sea Reef; on the west side by the Barabulla, Eastern Brace, and Western Sea Reef, and a small shoal called the French Flat,* situated near the edge of the Eastern Brace, in lat. 21° 19′ N., where the outermost buoy of this channel used to be placed. The 2nd, or Fairway Buoy, was generally placed 5 or 6 miles about N.N.W. from it, near the edge of the Eastern Brace, in about lat. 21° 25′ N.; but the buoys are sometimes taken up and placed differently, as the sands are constantly liable to change in this great river. Fairway, or Western Channel.

Ships passing out by the Fairway used to proceed down betwixt the French Flat and the tail of the Long Sand, and there the channel became wider between the tails of the Sea Reefs in proceeding out to seaward.

Bound into the river by the Fairway Channel, the manner of proceeding was different; for after running into Ballasore Road, and finding a pilot, the practice was to cross over the middle of the Western Brace into the Kell,† where the pilots generally anchored ships at the approach of night, or when they judged the depth of water on the Route pursued in entering this channel.

* Now said to have disappeared.

† The bottom being stiff clay in the Kell, with a heavy ground swell tumbling into it at times in the south-west monsoon, ships were frequently unable to weigh their anchors, and cross over the Eastern Brace, until the weather became moderate: this occasioned a great loss of time, and not seldom, of anchors. Proceeding into

Eastern Brace not sufficient for crossing. When the flood answered, the Eastern Brace was generally crossed in about lat. 21° 20′ to 21° 23′ N., a little to the southward of, or abreast the Fairway Buoy; being then in the channel, a course was steered from this buoy to the N.N. Eastward, for the lower buoy of the Barabulla, between which sand to the westward and the Long Sand to the eastward, was the track formerly pursued in proceeding up the river. This channel cannot be navigated with safety *at present* by ships drawing above 14 or 15 feet water.

Middle Channel.

MIDDLE CHANNEL, formed between the Long Sand to the westward, and the Eastern Sea Reef and Gasper Sands to the eastward, is narrow, with only 3 fathoms water in several places; it is, therefore, seldom navigated by vessels of any description.

Sagor Channel.

SAGOR CHANNEL, or EASTERN CHANNEL, formed by the Eastern Sea Reef on the west side, and Sagor Sand to the eastward, is that *at present* in general use by ships entering or departing from the River Hoogly, and it lies nearly in a N.N.W. direction, and opposite. The lower or outermost buoy in this channel, called the Reef Buoy, is *now* generally placed in 5½ fathoms near the edge of the Eastern Reef, in lat. 21° 13′ N., and it is *at present* a red one, of the spire form: these buoys ride greatly elevated, resembling beacons when viewed at a considerable distance, and are discerned much farther than those of the common construction. When a few miles to the northward of the Reef Buoy, the trees on Sagor Island may be seen from the poop of a large ship.

About 10 or 11 miles N.N.W. from the Reef Buoy, and in lat. 21° 21′ N., there is an elbow or projecting spit of the Eastern Sea Reef with 3 fathoms at low water, near to the edge of which a red buoy, called the Spit Buoy, is usually placed. And 3½ miles N. ¾ E. from the Spit Buoy, there is a red buoy, called the Lower Buoy of the Gasper, a little to the southward of the tail of the Gasper Sand, near to which a light vessel is sometimes stationed. Between the two last-mentioned buoys is the entrance into Thornhill Channel, in a north-west direction, which, about 3 miles distant from the Lower Buoy of the Gasper, becomes very contracted, as here pointed out between a red buoy on the edge of the Eastern Sea Reef, called the Reef Head Buoy, and a black buoy on the western edge of the Gasper Sand, called the Lower Buoy of Thornhill Channel, with a *fairway* buoy placed at times between these. The upper buoy of this channel is situated on the N.W. edge of the Gasper Sand, about 3½ miles North, a little westerly from the lower buoy.

To work up the channel in the N.E. monsoon.

A ship arriving at the entrance of Sagor Channel during favourable weather in the N.E. monsoon, and certain of her situation, may work up a considerable way with safety in search of a pilot. In doing this, she may borrow on the edge of the Eastern Sea Reef in tacking from the west side of the channel, as the water shoals regularly upon the verge of it on that side, although rather quick in some places. The depths in mid-channel, from 8½ and 9 fathoms, between the tail of the Sea Reef and the tail of Sagor Sand, will decrease gradually as she works to the northward, to about 6 fathoms when near the Reef Buoy. Here the depths are nearly the same from side to side, there being only about half a fathom more water toward Sagor Sand than there is in the western side near the Sea Reef.

When near the Reef Buoy, or in about lat. 21° 14′ N., a ship ought not to stand so

the river by the Western Channel, we lost two anchors in the Kell, and had our capstan broken, by the pitching of the ship when endeavouring to weigh them. I have known other ships arrive at Diamond Harbour without an anchor to let go, having lost all they had in Ballasore Road, and in the Kell.

near the edge of Sagor Sand as to shoal her water in working farther to the northward; for it is steep to, and dangerous to borrow upon. The best guide is to take the soundings from the edge of the Sea Reef, which may be approached to 5, or a quarter less 5 fathoms in working, until 5 or 6 miles to the northward of the Reef Buoy, or until the buoys on the tail of the Gasper Sands are seen; then the trees will be visible on Sagor Island from the poop or mizen shrouds, if the weather is clear, and she ought to anchor until a pilot is obtained. Here she will have 4½ or 5 fathoms at low water in the proper track, and it would be imprudent to venture farther up the channel without a pilot.

THORNHILL CHANNEL is about 9 miles South from the S.W. point of Sagor Island, pointed out by two buoys bearing East and West of each other 1 mile distant, the westernmost of which is painted *red* and the other *black*, and the depths between them are from 4¾ to 5¼ fathoms. These buoys are in lat. 21° 26½′ N., and the channel from them lies N. by W. to Sagor Road, on the west side of the black buoy, placed about 6 miles from them in the upper part of the channel. Thornhill Channel.

About 2½ or 3 miles to the N.E. of the two buoys which point out Thornhill Channel, there is a buoy at the eastern part of the Gasper Sand, in the Old Channel; and 2 miles farther to the N. Eastward lies another buoy, at the western edge of Sagor Middle Ground, pointing out the eastern boundary of that channel; but there is now a Middle Ridge, with 2¾ fathoms water on it, in the Old Channel which commences outside these buoys, and extends N.N.W. nearly to the south part of Sagor Island.

The Reef Head Buoy is red, laid on the edge of the Eastern Reef in 3½ fathoms,* and marks the western boundary of Thornhill Channel; when abreast of this buoy the upper and lower buoys of Thornhill Channel may be seen, which mark its eastern boundary, and are on the western edge of the Gasper Sand, the passage through Thornhill Channel being to the westward of them; they are painted black, the upper one bears from the Reef Head Buoy, N. 8° E. distant 4 miles, and the other bears from the Reef Head Buoy N. 39° E. distant 1½ miles, making the channel between them only about 1¼ miles wide.

The least water in Thornhill Channel at low tide is 2¾ fathoms,† but commonly 3, 3¼, and 3½ fathoms: the water in this channel is comparatively smooth in entering it from the eastern channel, being sheltered by the reef; yet in a ship of considerable draught, half flood, or even later, is the best time to pass through it, in order to be certain of sufficient depth of water; the tide rises in Thornhill Channel on the springs about 13 feet, and when not influenced by fresh gales, it is high water about 8h. 20m.

The course from the Reef Head Buoy, through Thornhill Channel, and up to Sagor Road, is North; if, however, a strong flood tide is running, a ship must be kept higher; the breakers on the head of the reef, in general, distinctly mark that side of the channel, while the Reef Head Buoy astern and the black or upper and lower buoy of Thornhill Channel to the eastward, if carefully observed, will shew the way a ship is making; the reef should, however, be kept close aboard, excepting on an ebb tide, until you pass the upper buoy of Thornhill Channel, when the passage is quite open, and you may steer boldly up to Sagor Road.

Thornhill Channel, generally used by the pilots, although well marked by buoys, is, however, in my opinion, inferior to the Old Channel, lying to the eastward of the Gasper, which has more water in it, and is as broad as Thornhill Channel.

* The Reef Head Buoy was in lat. 21° 26½′ N. in 1817.

† The least water is to be found when the Upper Black Buoy bears about N.E. one-third of a mile distant.

Old Channel.

THE OLD CHANNEL is formed by the Gasper Sand on the western side, and by a spit of Sagor Sand to the eastward, or, as the pilots say, a *middle ground*, which spit forms a gut to the eastward on Sagor Sand, and having no buoy on its extremity may be the principal reason it is not more frequented by the pilots; if, however, it were as well buoyed as Thornhill Channel, I should conceive it to possess many advantages, and although situated more to leeward, probably a ship would never find difficulty in getting through it, whenever the wind would admit of her laying through Thornhill Channel; and in easterly gales, when Thornhill Channel is impassable, if a ship were well over to Sagor Sand, I conceive she might effect a passage through the Old Channel to Sagor Road.

The depths in the Old Channel at low water are from 3 to 4 fathoms; the rise of tide on the springs is about 13 feet, or the same as in Thornhill Channel.

To pass through the Old Channel to the eastward of the Gasper in the S.W. monsoon, a ship should steer from the Spit Buoy about N. $\frac{1}{2}$ E. for the Lower Buoy of the Gasper, which is a red one, and bears from the Spit Buoy N. 8° E. distant $3\frac{3}{4}$ miles, and lies in $3\frac{3}{4}$ fathoms at low water; she should pass close to the eastward of the Lower Buoy of the Gasper; and will see the Middle Ground Buoy, which is black, and lies on the west edge of the Middle Ground or sand that forms the east side of this channel, bearing about N. by E.; she should keep well to windward of the Middle Ground Buoy, and endeavour to steer up along the east edge of the Gasper Sand for the Upper Buoy of the Gasper, which bears from the Lower Buoy of the Gasper N. 3° E., distant $3\frac{1}{2}$ miles, and will therefore easily be seen from the Lower Buoy; after passing the Upper Buoy of the Gasper, the passage is quite open to Sagor Road.

As the tides in S.W. gales generally set strong to the eastward, attention to the buoys is requisite to observe the way a ship is driving, and the weather side of the channels should be kept aboard, remembering that the tide does not set fair through those channels, for the ebb runs to the S.W. over the reefs, and to the flood N.E.

Lacam Channel.

LACAM CHANNEL, or CHANNEL CREEK, called by the natives Barratulla, is a small branch of Hoogly River; separating from it in lat. 21° 57′ N. on the north side of Mud Point, it takes an undulating course nearly S. by E., dividing Clive's Island and Sagor Island, on its western side, from the low land of the Sunderbunds to the eastward, then takes a direction on the east side of Sagor Sand to seaward about S.S.E. $\frac{1}{2}$ E. There are several sands in this channel that project from the different points of land on each side, which might easily be marked with buoys or beacons, the velocity of the tides being much less here than in the great branch of Hoogly River; in such case, the navigation by this channel would not be difficult, for several ships at different times having entered it by mistake, passed through in safety.

Mr. Lacam commenced a plan in 1770, to construct docks for large ships at an eligible place on the east side of the channel, which is called New Harbour; and he proposed to build a lighthouse on the point of land that forms the east side of the entrance, which projects several miles farther to seaward than the south end of Sagor Island, and has upon it a *tuft* of high trees. This part has been called Lighthouse Point, and its western extremity, called also Sayer's Point, has a sand projecting to the South and Eastward, and a considerable way to the S.E., but not so far out as Sagor Sand. In the entrance of the channel between Lighthouse Sand and Sagor Sand, the soundings decrease gradually in the east side, on the edge of Lighthouse Sand, but deepen in mid-channel in standing toward Sagor Sand, over a bottom of soft mud in the proper channel. A spit of sand extends from the tail of Sagor Sand, first N.N.W., then

N. by W. till it joins into Lighthouse Sand about 7 miles from the land, having generally from $4\frac{1}{2}$ to $3\frac{1}{4}$ fathoms on it, which may be considered a middle spit or bank, as it extends across the channel.

There are 7 and $6\frac{1}{2}$ fathoms in the entrance of the channel in the fair track, and from 4 to $4\frac{1}{2}$ fathoms at low water spring tides, about 5 or 6 miles below Lighthouse Point, deepening to 6 and 7 fathoms or more when near the land, between Sayer Point and the alluvial bank opposite to it, called Edmonstone Island, formed on the upper part of Sagor Sand, and which bounds the entrance of Moira Harbour on the western side.

As the navigation into the River Hoogly by Lacam Channel *may probably* in some future time be adopted, or become more frequented than at present, it was thought prudent to give some directions concerning it, and the harbour under Codjee Deep; for in such case the latter would be found of importance, as a place of shelter for ships in distress. When at the entrance of Lacam Channel, with a W.S.W., or Westerly gale, if a ship were unable to steer N.W. by N. into that channel, or ride at her anchors, the same wind would be favourable for crossing the southern part of Lighthouse Flat into Howe's Channel, and to run up that channel past Codjee Deep into the harbour.

The Charlton's passage through Lacam Channel.

The Company's ship Charlton arrived in Ballasore Road, in August, 1801, and finding no pilots there, stood to the eastward across the tails of the sea reefs, and unexpectedly got over the tail of Sagor Sand: she then hauled to the N.N.W., and anchored at 6 P.M., 18th August, in 7 fathoms at high water, loose sand, the tops of the trees on Lighthouse Point just visible from the deck, which bore nearly N.N.W., distant about 4 or $4\frac{1}{2}$ leagues. On the following morning, after weighing and steering N.N.W. $\frac{1}{2}$ W. 4 miles, she anchored in $4\frac{1}{2}$ fathoms the least water, with the trees N. by W. $\frac{1}{2}$ W.; the boat sounding to the northward had $3\frac{1}{2}$ fathoms sand, but to the westward, about 2 miles from the ship, the water deepened to 7 and 8 fathoms mud, near Sagor Sand. The ship was moved to this station, in 7 fathoms at low water, from whence the boat went to Lighthouse Point, and never had less than 6 fathoms; she then beat down to the ship against a light southerly wind, shoaling to $3\frac{1}{2}$ fathoms sand in the east side of the channel, and deepening again into 6 and 7 fathoms mud to the westward; by which she was guided, in a rather dark night. At 6 A.M., 20th August, the ship weighed and steered N.W. by N., which is nearly the line of Sagor Sand; within half a mile of it, they found the deepest water; there is a spit or projection in the sand, about 6 miles below Sayer Point, perceived by the water breaking in that part,* which is avoided, by steering a point or two more easterly for a few minutes. After the Charlton got abreast of Lighthouse Point, she moored in 11 fathoms, secured from the S.W. by a great part of Sagor Sand, dry at half tide; the boat was then sent to Sagor Road for a pilot, who carried her through Channel Creek, into Hoogly River.

To enter the channel with a fair wind.

Captain J. Cumberledge, of the Charlton, remarks, that a ship entering this channel from sea may stand boldly on, till the breakers on Sagor Sand are seen (as this sand is mostly steep on its eastern edge), and by keeping them half a mile on the larboard hand, the passage will be open. He farther observes, that a lighthouse, if erected on the point of land called Lighthouse Point, would be seen night and day, at a distance from danger, and would lead a ship into safety at all times without a pilot.

* A red buoy is sometimes placed on this spit of Sagor Sand, and a black buoy about 5 leagues to the S.E. on the tail of Lighthouse Sand, in lat. 21° 13′ N., in order to guide such vessels as may happen to get into this channel.

Many ships in the N.E. monsoon mistake the soundings on Sagor Sand for those of the Eastern Sea Reef, and work up Lacam Channel until the land is seen. If a ship, from stress of weather, or from any other cause, adopt this channel, and discern the tuft of trees on Lighthouse Point, bearing N. by W. ½ W., or N.N.W., she ought to steer about N.W. by N., as nearly as possible in mid-channel, where, over a bottom of soft mud, is found the deepest water. When Lighthouse Point is approached within 4 or 5 miles, she may steer a little more to the northward, and pass it about half a mile distant, in 8 or 9 fathoms, where she may moor and send the boat for a pilot; or she may proceed higher, with the boat a-head sounding, and anchor in 6 or 8 fathoms near the point of land on the eastern shore, about 4 miles N. by E. from Edmonstone's Island.

To leave the Channel.

From this place, the egress to the sea is more easy, and much shorter than from Sagor Road, as the sand on the east side of the entrance does not project so far out as those that bound the other channels to the westward.

A ship proceeding to sea by Lacam Channel, being abreast of Lighthouse Point, ought to steer first about S.S.E. to the Spit of Sagor Sand, and afterward S.E. by S., which will carry her clear out; observing, to keep as nearly in mid-channel as the wind will admit. But every ship bound to the River Hoogly ought to possess Captain Maxfield's survey of the approaches to that river, which includes also Lacam Channel.

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## DIRECTIONS FOR APPROACHING HOOGLY RIVER.

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Directions for approaching the river in the S.W. monsoon.

When the southerly winds begin to have strength, during the latter part of March, or early in April, the weather is generally hazy, preventing the land from being discerned unless it is very near, nor can observations be always obtained. It is therefore proper, for ships bound to the Hoogly River, in the strength of the S.W. monsoon, to fall in with the coast of Orixa to the southward about Pondy, or between it and Ganjam, where the land is of considerable height. They ought certainly not to exceed the latitude of Jaggernaut Pagodas, before getting in with the coast.

Making the land.

When a ship's distance from the land is not correctly known, at the time she is to the northward of lat. 18° N., it will be prudent to haul in, to get a sight of the coast, if it be day-light; in the night or in thick weather, the lead will be a sufficient guide, when it is attended to with care. Although the bank of soundings extends but a few leagues from land, there is generally from 30 to 35 fathoms about 2 or 3 leagues off shore, between the high land of Pondy and the Black Pagoda; if therefore the lead is hove every half-hour, when the rate of sailing is not great, it will give timely warning in approaching the coast. About Ganjam, the water shoals fast under 20 fathoms towards the shore.

Having seen the land, or obtained soundings, a ship may steer along the coast, keeping in 18 or 20 fathoms in the night, or with unsettled weather, until abreast of Manikpatam; she ought then to haul into 14 or 15 fathoms if it be day-light, and the wind favourable, to get a good sight of Jaggernaut and Black Pagodas, in passing. They will be discerned from 17 or 18 fathoms, although the weather is hazy, but with

a commanding breeze in day-light, the coast hereabout may be approached with safety to 12 or 13 fathoms, about 3 or 4 miles from the shore.

As the land is low and sandy close to the sea, it will not be seen in the night, unless a ship is very near; and in hazy weather, the noise of the surf on the beach would probably be the first indication of danger; it is, therefore, prudent, in the night, not to come under 15 fathoms, nor to deepen above 17 or 18 fathoms, which depths may be preserved by attending to the lead and running under easy sail.

It must be remembered, that from Manikpatam to 4 or 5 leagues beyond the Black Pagoda, the direction of the coast is generally between E. by N. ½ N., and E.N.E.; and from this Pagoda the course is about N.E. by E. to False Point, distance 16 or 17 leagues.

Course along shore.

Being 3 or 4 leagues past the Black Pagoda, a direct course should be followed to obtain the proper soundings off False Point, taking care not to haul into Cojung Bight or Bay, about half-way between them, which, although small, has sometimes been mistaken for False Bay; this cannot happen if the Jaggernaut or Black Pagodas are seen, and the distance from them attended to. As the flood inclines towards the shore, and the ebb from it, in steering from False Point, the lead must be the principal guide; 14 and 15 fathoms are good depths to preserve with a fair wind, and the bottom will generally be green mud, mixed at times with brown sand and shells.

The depths decrease gradually toward the bank, surrounding False Point; but it is prudent to keep in 14 or 15 fathoms when passing it in the night, or in 16 fathoms if the wind is S. Easterly.

Soundings.

When abreast of False Point, in 14 or 15 fathoms, the bottom in some places is coarse brown sand and shells, with black specks; in other places, mud and sand; but to the northward of this point, all over False Bay, the bottom is very soft green mud.

With False Point bearing W.N.W., in 14 or 15 fathoms, the course is N.E. 10 leagues, to clear the bank off Point Palmiras; but as the tides affect a ship laterally, the lead is the only certain guide, and she ought to keep in 14 or 15 fathoms with a commanding breeze, or in 16 fathoms if the wind is S. Easterly.

After passing False Point, and getting soundings of soft green mud, these will continue in crossing the southern part of False Bay; but when 5 or 6 leagues from the former point, in 15 and 16 fathoms, the bottom changes from soft mud to reddish sand and shells, on the southern part of the extensive bank surrounding Point Palmiras. Keeping in 15 fathoms in rounding the bank, the bottom will continue nearly the same, red or brown sand with shells, until Point Palmiras is abreast, bearing about W.N.W.; then the sand is intermixed with black specks and gravel stones, which are the soundings of the reef. When near the edge of it in 13 or 14 fathoms, the sand is coarse with gravel, but farther out in 17 or 18 fathoms, it is generally of finer quality, intermixed with black specks and shells.

These soundings of the reef are considered the best guide to point out when abreast of Point Palmiras in the night, or in thick weather; from whence it is proper to haul up N.N.W. for the station of the pilot vessels in 15 or 16 fathoms in Ballasore Bay, or Road. It, however, has been often experienced, that ships after having rounded Point Palmiras in 17 fathoms, and deepened into 19 fathoms, hauled up N.N.W. for the road, but were carried over towards the Western Sea Reef by a strong ebb tide, which sets out of the road to the S.E., and the flood to the N.W.,* during the S.W. monsoon.

* The flood only sets to the N.W. and N.N.W. in the vicinity of the reef; for a few leagues farther out, in 19 and 20 fathoms, it sets frequently to the N. Eastward, or becomes a constant N. Easterly current in blowing weather.

Cautions in rounding Palmiras Reef.

False Point has sometimes been mistaken for Point Palmiras, and the latter sometimes for the former, whereby several vessels, in the first case, have been wrecked on the shore, by hauling into False Bay instead of the Bay of Ballasore, and others have got to the eastward on the Sea Reefs by keeping too far from the land. To avoid either of these extremes, the following remarks may be useful.

For rounding both the False and True Points 15 fathoms is a good track, also in crossing the bay between them; this depth is far from danger off the former, and also when Point Palmiras bears well to the northward, but when this Point is bearing to the southward of West, the 15 fathoms track is not far from the edge of its reef; for here the water shoals suddenly from 10 to 7 fathoms, then to $2\frac{1}{2}$ or 3 fathoms rocks in some places.

If the pagodas, or the coast near them, or Manikpatam has not been seen, and in steering along in 14 or 15 fathoms, a ship get soundings of sand, shells, and black specks, which are thought to be those off False Point, but uncertain whether they may not be those off Point Palmiras, her situation not being correctly known; to determine this, it may be observed, that the water will not deepen in steering N.E., from having 15 fathoms off the False Point; but in steering the same course from having 15 fathoms on the edge of the bank off Point Palmiras, the water will deepen gradually to 17 and 18 fathoms; she ought then to haul to the N.N.W., or N. Westward, until she get into 16 or 15 fathoms, in which depths the pilot vessels generally anchor at night during the S.W. monsoon, in Ballasore Road.

If blowing strong at S.W. in rounding Palmiras Reef in day-light, a ship may steer along the edge of it in 12 or 14 fathoms, taking care not to approach the N. Eastern part under 12 or 13 fathoms, where it is dangerous and steep under 10 or 11 fathoms. When round that part, she may haul to the N.W., and anchor to the northward of the Sandy Island Mypurra, where she will be sheltered from the sea by the reef.

Another guide to know the soundings off the False Point from those off Point Palmiras may be observed. If, in 15 or 16 fathoms abreast the former, a ship steer North, the depth will soon decrease over a bottom of soft mud or green ooze, in False Bay; but from 15 or 16 fathoms abreast of Point Palmiras, the water will not shoal steering North, but rather deepen, if a ship is clear of the N. Eastern extremity of the reef. If a ship haul up too soon for Ballasore Road, the water will shoal suddenly on the N. Eastern edge of the reef, over a sandy bottom; she ought in such case to edge out immediately into 15 or 16 fathoms, the bottom then in the fair track will soon change to stiff blue clay, mixed with sand and stones, or at times with shells; and this is, in general, the quality of the ground to the northward of Point Palmiras, in the Bay of Ballasore.

Lighthouse on Point Palmiras.

The Lighthouse erected on Point Palmiras was of great utility *in clear weather*, to guide ships round the reef by day or by night; for, by the bearing of the light, they could borrow on the edge of the reef where the soundings are regular, and avoid the steep part at its N.E. end. When clear of this extremity, the light would answer as a farther guide to conduct them into smooth water, where they could anchor in 9 or 10 fathoms under the lee of the reef, when the light was brought well to the southward. This lighthouse is now, however, in ruins, having been undermined by the sea.*

It is also desirable that this anchorage under the lee of the reef off Point Palmiras be adopted as one of the stations for the pilot vessels to ride during the S.W. monsoon, when the weather is stormy, for then some pilots would probably be found at this station; but hitherto ships have frequently rode in Ballasore Road for several days toge-

* See Remarks under "False Point," p. 608.

ther, in danger of losing their anchors, all the pilot vessels being in the river, which is often experienced in blowing weather.

Although a lighthouse has been erected on Point Palmiras, it may frequently happen, by night or by day, that thick rainy weather will prevent the light, or lighthouse, from being discerned; consequently, at such times, ships will have no guide but the soundings in rounding the reef. When this happens, they may be liable to fall to leeward of the anchoring station under the point, if none of the pilot vessels are discerned at their stations in the offing. For although these vessels may in stormy weather anchor under Mypurra Island and the adjoining reef, yet, when the weather will permit, they keep under sail in a line directly East from the lighthouse.

When pilot vessels are in Ballasore Road during the S.W. monsoon, they generally anchor in the evening, in from 13 to 15 fathoms water;* in the morning they weigh when the weather will permit, and traverse the road in search of ships during the day; but the following instructions, issued by the Master Attendant at Calcutta, to the pilot vessels, will best point out their cruizing station. Pilot vessels' station.

1st.—The vessel under your charge, being now ready for sea, equipped and completely stored for a cruize of three months, you are hereby directed to proceed out with her into the roads with all practicable expedition, in order to cruize (for the general benefit of the trade resorting to this port) off the outer edge of the reef off Point Palmiras, bringing the Point to bear, by sight or computation, West, which position will place you in about 16 fathoms water, the ground composed of sand and gravel, with broken shells and black specks, or in about lat. 20° 43′ N., and this line is to be the southern boundary of your cruizing station during the S.W. monsoon. Cruizing ground of the pilot vessels.

2nd.—As the position above assigned is invariably passed or crossed by all ships and vessels bound into the River Hoogly, during the S.W. monsoon, it is therefore desirable that you should keep as near it during the continuance of your cruize, as the state of the winds, weather, and tide will admit; all considerations which comprehend the security of the vessel under your charge from the enemy, and other disasters, are left to your discretion, as the necessary consequence of the dependence placed in your zealous and faithful execution of the important trust confided to your management.

3rd.—On the change of the seasons, you are to quit the station prescribed in the preceding paragraph, and to cruize off the tail of Sagor Reef, in lat. 21° N. and about lon. 88° 40′ E., being particularly cautious in guarding against the designs of the enemy's cruizers.

When the weather is moderate, ships may keep under sail in the day with the ebb tide, standing occasionally to the eastward to 11 or 12 fathoms, near the tail of the Western Sea Reef, crossing Ballasore Road in 14 and 15 fathoms. By traversing the road in the day when any pilot vessels are there, the chance of soon discovering one will be much greater than by remaining at anchor; but attention to the set of the tides is requisite, for a ship keeping under sail, with strong flood tides on the springs, might be liable to get over to the N. Eastward, too far up upon the Western Sea Reef. Directions for discovering the pilot vessels.

The pilot vessels are generally snow rigged, with a small jigger mast on the stern, and the first that is spoken with by any ship, if it is not their *turn* to take charge, they will direct her where to find the pilot, whose vessel will shew a small red flag at the gaff end. Description of pilot vessels.

At *present*, pilot vessels in the N.E. monsoon are found at the entrance of the Eastern

* See remarks respecting the pilot vessels, p. 611.

Pilots' station in N.E. monsoon.

Channel, and they generally anchor on the Eastern Sea Reef at night, or during the flood in the day. At times a pilot vessel may be found to the eastward of Sagor Sand, or to the westward of the Western Sea Reef, on the look-out for ships that have deviated from the common route: but as several of the pilot snows were captured by French privateers during the last war, they seldom at that time ventured so far out as the tails of the Sea Reefs; and unless they were met with conducting ships out of the river, inward-bound ships had often to work up channel to the Reef Buoy, or a little higher, before a pilot could be got; but *now* they are found at the tails of the reefs.

Floating light.

A floating light vessel is stationed in the Eastern Channel, a little to the northward of the tail of the Eastern Sea Reef, in lat. 21° 4′ N., which is an excellent guide for ships approaching the Eastern or Sagor Channel: another floating light has been placed at the tail of the Gasper Sand, to lead ships into Thornhill Channel.

Cautions on approaching the sea reefs.

If a ship get accidentally on the tail of any of the sea reefs, she ought not to stand into shoal water, for the sea runs high upon them in the S.W. monsoon; it will be prudent to tack or haul off immediately into deep water, or anchor until the ebb tide enables her to work to the southward clear of them.

In September, when the strength of the monsoon is abated, it is not considered dangerous to stand to the eastward in 12 or 11 fathoms, near the tails of the sea reefs, particularly in favourable weather; by doing so pilots may at times be found, bringing out ships by the Eastern Channel; but it is only when no pilots are found in the road, and the weather settled, that a ship may venture to stand near the tails of the sea reefs in search of one, and it ought not to be done in the months when the monsoon generally blows strong.*

Route to enter the Eastern Channel.

Since the Western Channel has become dangerous for large ships, by a decrease in the depth of water, and the Eastern or Sagor Channel now adopted, the pilots, to enter it, in conducting ships from Ballasore Road in the S.W. monsoon, steer to the eastward, crossing over the tails of the Western and Eastern Sea Reefs, the soundings obtained on these being their principal guide.

Track along the Aracan Coast.

Ships bound to Hoogly River during the N.E. monsoon were formerly directed to keep close along the coast of Aracan to lat. 21° N., or in sight of the White Cliffs, and from thence to steer W. or W. by N., between lat. 21° N., and 21° 20′ N.; which route is not advisable to be followed.

This circuitous route was chosen that ships might be enabled to anchor in moderate depths when calms and faint airs prevailed, and to prevent currents occasioned by the freshes out of the rivers drifting them to the southward out of soundings. These southerly currents are, however, seldom experienced except in the vicinity of the land, where also faint airs and calms prevail more than farther out in the open sea; on which account, it seems advisable to keep at a moderate distance from the Aracan Coast, and the N. Eastern angle of the bay, in proceeding to the River Hoogly in the N. E. monsoon.†

* Some navigators, however, well acquainted with the river, have crossed over the sea reefs, without pilots, in ships at an easy draught of water. The Sir William Pultney, about 500 tons burthen, being light, with troops on board, arrived in Ballasore Road, 10th of July, 1806: finding no pilot vessels there, she weighed at day-light, crossed the Western Sea Reef in 5 fathoms, and steering on to the eastward, soon after, the Eastern Sea Reef in 4 fathoms: at noon she hove to, in 6 fathoms, soft ground, in Sagor Channel, observed lat. 21° 15′ N. directly after the reef buoy was seen, then made sail up channel, passed the Gasper buoy at 4 P.M., and half an hour after got a pilot.

† Brief instructions for ships proceeding into the Bay of Bengal during this monsoon have been given in a former section of this work.

Whether a ship has departed from the vicinity of the Andaman Islands, or from Cape Negrais, she ought to endeavour to make as much *northing* as the winds will permit, taking care not to get too far to the westward; this will be avoided by tacking to the eastward at times, when the wind veers more northerly than usual.

In an indifferently sailing ship, or when the longitude is not correctly ascertained by chronometers or otherwise, it may be prudent to endeavour to get into soundings, about 14 or 15 leagues to the eastward of Sagor Sand, then across over the Swatch or chasm in the bank, which will point out the true situation.

THE SWATCH OF NO GROUND extends nearly N. by E. from lat. 21° to 21° 22′ N., and is about 5 leagues broad, but its shape and dimensions are not *exactly* determined; there are no soundings to be got in it, with from 150 to 50 or 60 fathoms of line. Its northern extremity is distant from the land only about 5 leagues, with depths between them from 13 fathoms near the former, decreasing to 3 fathoms towards the land. Round the other parts of it, the depths are generally from 40 to 20 fathoms. The western edge of the Swatch, in lat. 21° 12′ N., is about 11 or 12 leagues to the eastward of Sagor Sand. Swatch of No Ground.

Ships getting into soundings far to the eastward ought to borrow towards the land to 17 or 20 fathoms, that they may be enabled to anchor in moderate depths when requisite, or benefit by the tides when favourable for proceeding to the westward. For in deep water calms are frequent, with a drain of easterly current in the N.E. angle of the bay, and the influence of the ebbs setting to the southward reaches farther out than that of the flood tides. Currents.

From what has been stated, it is advisable for all ships bound to Hoogly River, from the commencement of the N.E. monsoon, to its failure in the early part of March, to endeavour not to get to the westward of the Eastern Sea Reef; but rather to obtain soundings on this reef, or on the tail of Sagor Sand, that their true situation may be known. Caution.

A ship coming directly from the southward upon the tail of a sea reef cannot be certain on which of them she has struck soundings, although her longitude may be known tolerably well by chronometers or observations. She ought, in this case, to keep a good look-out for ships coming out of the river, and if several are seen, or a single large one be standing out to sea, her situation may be known, for in all *probability* those ships are proceeding out by the Eastern Channel.

To approach this channel from seaward, when the longitude is known near the truth, the most advisable method is to get soundings on the tail of Sagor Sand, or on the Eastern Sea Reef. To effect this, a ship should endeavour to get into lat. 21° 4′ or 21° 5′ N., whilst to the eastward of Sagor Sand, and steer West, keeping in $8\frac{1}{2}$ fathoms at low water, or about $9\frac{1}{2}$ or 10 fathoms at high water; she will have soft ground in this parallel until the depths decrease suddenly on the tail of Sagor Sand, over a hard bottom. If near low water, she may edge to the southward a little, and after crossing its southern extremity in 5, 6, or 7 fathoms, haul to the N. Westward into the proper channel. If more than half flood, she may cross over Sagor Sand when the latitude does not exceed 21° 8′ or 21° 9′ N., but this sand or reef being steep on both sides, ought always to be approached with caution, particularly to the northward of the latitude last mentioned. To approach Sagor Channel in the N.E. monsoon.

If in steering to the westward a ship keep exactly in lat. 21° 0′ N., she will miss the tail of Sagor Sand, but get upon the Eastern Sea Reef in $6\frac{1}{2}$ or 7 fathoms hard sand, about 12 miles to the westward of the former; it seems, however, preferable to keep so

far up as to get the first hard soundings on Sagor Sand, when the weather is favourable and the sea smooth, to prevent mistakes; for many ships have thought the soundings they had on it to be those of the Eastern Sea Reef, when they came upon it from the southward.

When soundings have been obtained on the tail of Sagor Sand, or on the Eastern Sea Reef, and a ship's true place is ascertained to be at the entrance of the Eastern Channel, she may, if no pilot vessel is discerned, work up in search of one to the Reef Buoy, or a little farther, taking her soundings on the edge of the sea reef in tacking from the westward, and standing about a half or two-thirds of the channel over towards Sagor Sand on the eastern tack, agreeably to the directions given in describing *Sagor Channel*,* in the preceding section, "Entrance to Hoogly River."

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## DIRECTIONS FOR SAILING FROM FALSE POINT TO THE SAND HEADS, AND TO SAGOR ROAD.†

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Pilot schooners' Station.

DURING the prevalence of the S.W. monsoon, or from March 1st to October 1st, the pilot schooners cruize off the Reef of Palmiras in 17 or 18 fathoms, and about lat. 20° 45′ N.; they in general anchor during the night, and cruize during the day.

They should, during the prevalence of the S.W. monsoon, be always found off the eastern edge of Palmiras Reef, in about 17 fathoms, and not to the northward of lat. 20° 44′ N.; I have, however, found them in lat. 20° 51′ N., which is too far to the northward, and attended with much disadvantage if the wind hang far to the eastward, which happens frequently at the close of the S.W. monsoon; since the difficulty of getting to the eastward is then increased by obtaining the pilot so far to the northward, and a stranger, under such circumstances, advances to the northward in quest of a pilot with much caution and anxiety; hence, it is much to be regretted that no ostensible object offers itself as a fixed station,‡ where a pilot might be found with certainty, and also an exact place of departure afforded, from which he might shape his course to the Western Reef with greater confidence than he can do at present.

By reference to my survey of the Tails of the Reefs and tract from False Point Palmiras, the navigator will require but little instruction, as the different descriptions of soundings, nature of the ground, and run, will best enable him to ascertain his situation.§

Of making the land.

During the strength of the S.W. monsoon, ships generally endeavour to make the land about Jaggernaut, or the Black Pagoda, to determine their situation, which may

* The Sagor Channel, although *recently* adopted as the best for entering or departing from the River Hoogly, was *formerly* frequented; the ships Mermaid, Severn, Mary, Samuel, and Jane, proceeded to sea by it 16th December, 1712; and it was much frequented in early times.

† By Captain W. Maxfield, Assistant Marine Surveyor.

‡ These remarks were given before the lighthouse was erected on the Island of Mypurra, Point Palmiras.

§ Although, in offering these directions to the public, I have endeavoured to render them as clear and explanatory as possible, they must be considered as an accompaniment to the chart they are intended to illustrate, rather than a sufficient guide without it.

be proper while the monsoon prevails steady from the S.W. and Westward; but likely to cause delay and inconvenience towards the close of the monsoon, or in September, when the wind often hangs much to the eastward, and the current sets strong to the S.W. through False Bay, rendering it often very difficult to get to the N.E. if you happen to be near the shore; during that month, if the latitude can be observed at a moderate distance from the True Point, so as to obtain the olive-coloured mud soundings in and opposite to False Bay, there can be little occasion for making the land so far to the S.W.; for, although I have sometimes experienced little or no current even in September, off the pagodas and near the shore, still it was running very strong round Palmiras Reef and through False Bay, rendering it very difficult for a ship to get to the N.E. if the wind hang to the eastward.

By a careful attention to the nature of the ground, soundings, and run, the True and False Points of Palmiras may be distinguished, although the soundings, in my opinion, do not offer an infallible guide; yet, when combined with the presumptive latitude, run, and other circumstances which govern the judicious navigator, they afford satisfactory tests to determine his position; and by carefully consulting the soundings on the track from Point Palmiras to the tail of the Western Sea Reef, he may approach and cross the reefs with certainty; by attention to his lead in proceeding to the N.E., it is evident, by reference to the chart, that he cannot miss the Western Sea Reef or mistake one for the other, nor can this ever happen to pilots but from inattention.

False Point Palmiras is in lat. 20° 20′ N., lon. 87° 0′ E., and lies S.S.W. $\frac{3}{4}$ W. about 25 miles from the Island of Mypurra, which being joined by a sandy isthmus to Point Palmiras, forms the eastern extreme of True Point Palmiras, and which I make in lat. 20° 41′ N., lon. 87° 13′ E. Palmiras, False and True Points.

In the bay formed between the False and True Points are five small sandy islands, the northernmost of which is in lat. 20° 24′ N.; they may be safely approached, as the soundings are regular to them, and from False Point to True Point there are no dangers, therefore the coast may be safely approached by the lead, remembering that the flood tide sets on, and the ebb off shore, except at the latter end of the S.W. monsoon the current sets constantly to the S.W. False Bay.

In lat. 20° 16′ N., about 7 miles to the S.W. of False Point, there is a small point resembling an island, having a clump of trees on its north end, which is probably often set as False Point; the only remarkable object between False Point and the Island Mypurra, or True Point Palmiras, is a large round tree, with a single tree to the eastward of it, in lat. 20° 29$\frac{1}{2}$′ N., bearing North from False Point, and a large sandy cliff, in lat. 20° 33′ N., which rises like the roof of a house: there is also a remarkable Sand Hill, resembling a tower, in lat. 20° 37′ N. and about 5 miles to the S.W. of Mypurra.

False Point terminates in a low sandy projection, forming a small cove or bay within it to the N. Westward with 2 fathoms water, which would afford shelter for a small vessel in distress, or destitute of ground tackling, as she might anchor completely sheltered from all winds except the N.E., and ride in smooth water.*

East of the False Point, in 10$\frac{1}{2}$ or 11 fathoms, you will be distant from it about 4 miles; when to the northward between it and True Point, 10 or 11 fathoms will place you much further off shore; but unless you are desirous of seeing the land between those points, it will be prudent to keep more to the eastward, as the true course from Directions.

* Ships have been lost by standing into False Bay, supposing it to be Ballasore Road; how such disaster could have occurred seems strange, as a ship may stand safely in by her lead to 7 fathoms, and will then be but 2 miles or less off shore.

or 20° 44′ N., and having about 17 or 17½ fathoms, you may safely steer N.E., and if on this course you are going fast, and do not deepen to more than 21 or 22 fathoms, there is no chance of falling to leeward of the Western Reef; you may steer the same course until you shoal to 17 fathoms, then haul up East to cross the reefs. Should you, however, on the course here given, from current, swell, or tide, find the water deepen to more than 22 or 23 fathoms, it will be desirable to haul up more to the northward, even to North or N. by E., in order to be certain of shoaling to 17 fathoms to the westward of the Western Reef; by reference to my survey,* the depth of water and quality of the ground will best shew the course made good, and enable the navigator to preserve the track pointed out on the chart, and a strict attention to the lead will enable him, with such aid, to find the Floating Light† either by day or night. True Point Palmiras.

Having shoaled to 17 fathoms, haul up East or E. by S. to cross the Reefs, attending particularly to the lead and rate of sailing, noting the distance run from 15 fathoms until you are in 7 or 8 fathoms on a reef, and you cannot fail in determining if you are then upon the Western Reef or otherwise. Of crossing the Reefs.

From 15 fathoms West of the Western Reef to 7 or 8 fathoms on it, the distance should be about 4 or 4½ miles, whereas from 15 fathoms West of the Eastern Reef to 7 or 8 fathoms on it, the distance will be nearly 10 miles.

When W.S.W., S.W., or S. by W. of the Western Sea Reef, in 21 fathoms, you will be distant from 8 fathoms on its edge about 5 miles, whereas, in approaching the Eastern Sea Reef from the W.S.W. you will run about 12 or 13 miles from 21 fathoms before you shoal on the reef to 8 or 9 fathoms; but in approaching it from a S.W. direction you will from 21 fathoms run about 8 or 9 miles only, before you shoal to 8½ or 9 on its extremity; and due South from it in 21 fathoms, the distance will be about 5 miles from the tail of the reef; hence it is desirable, in making either of the reefs, to approach them from the westward, in order to distinguish one from the other with certainty, as the nature of the ground on all the reefs is similar, being dark-coloured hard sand, with bright specks, resembling steel filings.

Being convinced that your soundings are on the Western Sea Reef, continue to steer E. by S., crossing the reef in 5½, 6, 7, or 8 fathoms, according to circumstances; if, however, you can lay higher, and be likely to get less water than you wish, haul more out, as there is generally much swell on the reefs.

After crossing the Western Sea Reef, over which the soundings are very regular, from 7 fathoms on one side to 7 on the other, the distance across being from 7 to 8 miles, you then deepen into the South or Western Channel, in which the floating light† is stationed as mentioned above.

The tail of the Western Brace being 9 miles to the northward of the tail of the Western Reef, it is hardly possible to mistake one for the other; it may, however, be easily known, as the brace is very narrow, being scarcely 1½ miles wide.

The channels between the reefs, particularly on the western sides, are usually rather hard, and not that soft mud they are generally believed to be; however, as the water is always deeper in a channel than on the reefs, you may know you have fallen off a reef into a channel by the increase of water.‡ The western sides of all the channels,

* Chart of the Sea Reefs and approach to the River Hoogly, by Captain Maxfield, in three sheets.

† The floating Light Vessel here referred to has been removed from the Western Channel, and placed stationary at the entrance of the Eastern Channel.

‡ In the South or Western Channel you have 3 or 4 fathoms more water than on the Western Reef, and in the Eastern Channel about 3½ fathoms more than on the Eastern Reef; the pilots reckon more water in channels compared with the reefs than I have generally found, and allow 4 or 4½ fathoms more than on the reefs.

generally mud and sand, are often pretty hard, and the soft ground is only found on the eastern side of them, where it is in general rather deeper, and indicates your approach to the sand bounding the eastern side of the channel.

It is therefore desirable, after crossing the Eastern Reef, to keep along its eastern edge; the pilots in general, after having deepened over the reef to 7 fathoms, haul up N.N.W. for the Reef Buoy,* which should be about that bearing; however, if the wind is far to the westward and a flood tide running, it may often be proper, in a dull-sailing ship, to haul up N.N.W. as soon as you begin to deepen off the Eastern Reef and before you have got 7 fathoms, going close to the Reef Buoy in order to reach the Spit Buoy without difficulty, the course being from the Reef Buoy to the Spit Buoy N.N.W.† $10\frac{1}{2}$ miles; after passing the Spit Buoy, keeping along the edge of the reef, the lower buoy of the Gasper will be seen, which bears from the Spit Buoy N. 8° E., distant $3\frac{3}{4}$ miles; if the pilot intend going through Thornhill Channel, which is to the westward of the Gasper Sand, he keeps along the edge of the reef, leaving the lower buoy of the Gasper well to leeward, and passes to the eastward of the Reef Head Buoy, which bears from the Spit Buoy N.N.W. $\frac{3}{4}$ W., distant $5\frac{1}{2}$ miles, and W.N.W. from the lower buoy of the Gasper, distant $3\frac{1}{2}$ miles.

Buoys. Although the buoys may, from breaking the chains, and a slight increase in the dimensions of a sand, be occasionally removed a little from the bearings I have given them, yet, as they are designed to mark the sides of the channels, their relative general bearings will be applicable, and illustrate the passage, which may always be known by the colour of the buoys, as it is a general rule, in buoying off the channels and sands at the entrance of the River Hoogly, to place the black buoys on the west edge of a sand or danger, denoting that the safe passage is to the westward of it; and the red buoys being laid always on the east edge of a sand or danger, denote the passage to be to the eastward of the same.

Sea Reefs, &c. The tail of the Eastern Sea Reef, in 9 fathoms at low water spring tides, extends to lat. 20° 58′ N.; but the Western Sea Reef, in 9 fathoms at low water spring tides, extends only to lat. 21° 0′ 30″ N., and Sagor Sand terminates in 9 fathoms in lat. 21° 0′ N.‡

It is proper to observe, that in Sagor Sand, above lat. 21° 4′ 30″ N., there is a gut of half a fathom deeper water, and in some parts near a fathom more than on the sand close to it, which gut is from 1 to 2 miles wide, when you shoal again on what the pilots call a Middle Ground, about $1\frac{1}{2}$ miles wide, and deepen into Lacam Channel. If in crossing a sand the gut of deeper water above described is perceived, you may be certain of having crossed Sagor Sand; but if it were crossed below the gut, your mistake would not be so easily detected. Considering, however, that on the navigator's leaving False Point, or Point Palmiras, he endeavours to strike soundings on the tail of the Western Reef, great want of judgment, or neglect of the ship's way, can only carry him so far east as Sagor Sand, which is 11 leagues to the eastward of the Western Reef; it is therefore reasonable to believe, that if he miss the Western Reef, he will strike soundings on the Eastern one, and by a careful regard to the ship's way and the lead, such an error will not occur.

* The Reef Buoy is laid on the east edge of the Eastern Reef in 5 fathoms at low water, and was in lat. 21° 12′ 20″ N. in 1817.

† On a flood tide, it may be advisable to steer about N.N.W. $\frac{1}{2}$ W. or N.W. by N. to keep on the edge of the Eastern Reef.

‡ These latitudes of the tails of the sands, as here stated, may probably be 1 or $1\frac{1}{2}$ miles farther South than their true limits at the present time.

But as a Floating Light* is moored in 8 fathoms in the Eastern Channel in lat. 21°3½′N. from October 1st to March 1st, the navigator, if in doubt of which reef he has crossed, should endeavour, by traversing in 8 to 10 fathoms, to sight the Floating Light, and should he not succeed in finding her, or should she be driven from her station, which is not probable, he may with certainty, by continuing to stand to the westward until he has crossed the Western Reef, determine his position; as with due attention to the foregoing remarks, the difference of depth, and its rapid increase from that reef, affords an unerring guide to the judicious navigator, who with the chart before him, and attention to the directions, may proceed with confidence in case of necessity.

In the channel the tides set as follows, when uninfluenced by the wind:— Tides.

| | |
|---|---|
| 1st Quarter flood | N.W. by W., 2nd Quarter N.N.W. |
| 3rd Quarter | N.N.E., last Quarter E.N.E. |
| 1st Quarter ebb | S.E. by E., 2nd Quarter ebb S.S.E. |
| 3rd Quarter | S. by W., last Quarter S.W. and W.S.W. |

At the tails of the reefs the tide rises about 9 feet on the springs, and when off the reef, the set in the neaps is governed entirely by the wind, generally running to the southward and westward.

Many of the pilots endeavour, by steering to the northward, to cross the tail of the Western Brace, which was an invariable practice formerly, in order to ascertain their exact position; in my opinion, such precaution is unnecessary and very injudicious, since the tail of the Brace is in lat. 21° 9′ N., a ship is by that route carried too far to the northward to enable her to cross the reef sufficiently down, unless the wind be far to the westward: and as the wind of the latter part of the S.W. monsoon often blows from the S.E., such a route is attended with inconvenience and danger; the difference of depth on approaching the Western and Eastern Reefs from the westward affords very sufficient data to distinguish one from the other without going in quest of the Western Brace. The Custom of crossing the Western Brace.

It is necessary to observe, that two buoys were placed some time ago in Lacam Channel, one of which is laid on the edge of Lighthouse Sand in 4¼ fathoms, and being in lat. 20° 13½′ N., is nearly parallel to the Reef Buoy in the Eastern Channel; however, one may be easily known from the other, as the Reef Buoy is a red one, and is laid on the east edge of the Eastern Reef, whereas the buoy on Lighthouse Sand is black, and being on the west edge of Lighthouse Sand, has shoal water immediately to the eastward of it.

The other buoy in Lacam Channel is laid on the east edge of a spit of Sagor Sand, in lat. 21° 24¾′ N.; it is painted red, and bears from the buoy on Lighthouse Sand N. 44°W., distant 15 miles, and is in 3¼ fathoms; from it the grove, or clump of trees, on Lighthouse Point, is seen bearing about N. by W. ½ W.; however, the remarks before men-

* The Floating Light is usually moored in the Eastern Channel in 8 fathoms, and in lat. 21° 3′ 25″ N., lon. 88° 12′ E. But sometimes the Floating Light Vessels have been removed, and a Pilot Vessel then occupies the station of that Light Vessel which was moored in the Eastern Channel, exhibiting a light in the night; and a Station Buoy is moored here, as a guide, in case of the absence of the Pilot Vessel, which sometimes happens. Mr. J. Higgs, of the Royal Navy, states that the Light Vessel was placed in lat. 21° 5′ N. in 1832, and the buoy about three-quarters of a mile N.E. from the vessel, and that she is now stationary there in both monsoons. At 8 P.M. every night throughout the year, she burns a brilliant blue light, and also at every alternate hour afterward, until day-light; the glare of which may be seen 10 or 12 miles. At 9 P.M., and at every other alternate hour during the night, a large red torchlight is shewn, so that, exclusive of her light at the masthead, she cannot fail being seen by vessels approaching, from 8 P.M. to sunrise, at least 8 miles off, except in hazy weather.

tioned, if attended to, will prevent the possibility of mistaking Lacam Channel for the Eastern Channel, and the ridge of sand running from Lighthouse Sand to the tail of Sagor Sand clearly points out one from the other.

I shall conclude these remarks by giving the true bearings and distance of the tails of the reefs, &c., from the False and True Points, with soundings on those bearings; but it is necessary to observe, that the soundings are given for low water spring tides, therefore rather more water will generally be found.

*Bearings, Distances, and Soundings, from False Point Palmiras in a direct line towards the Western Brace, Western Reef, Eastern Reef, and Sagor Sand, commencing from False Point.*

| Tail of the Western Brace, N. 31° E. Distance 22½ leagues. | | | Western Sea Reef, N. 54° E. Distance 24½ leagues. | | | Eastern Sea Reef, N. 63° E. Distance 30 leagues. | | | Sagor Sand, N. 66° E. Distance 34½ leagues. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Miles. | Fathoms. | Remarks. | Miles. | Fathoms. | Remarks. | Miles. | Fathoms. | Remarks. | Miles. | Fathoms. | Remarks. |
| At 10 | 10 | | at 10 | $10\frac{1}{4}$ | Mud. | at 10 | 11 | Mud. | at 10 | 12 | Mud. |
| At 20 | 9 | Mud. | at 20 | 10 | | at 20 | $12\frac{1}{2}$ | | at 20 | 13 | |
| At 30 | $4\frac{1}{2}$ | on Reef | at 30 | 12 | Sand. | at 30 | 14 | | at 30 | 15 | |
| At 40 | $17\frac{1}{2}$ | Sand. | at 40 | 18 | Coarse Sand & Shells. | at 40 | 11 | Sand and Shells. | at 40 | 21 | Sand and Gravel. |
| At 50 | 16 | | at 50 | 19 | Sand & Shells. | at 50 | 24 | Mud. | at 50 | 27 | Mud & Sand. |
| At 60 | 17 | Mud. | at 60 | 23 | | at 60 | 27 | | at 60 | 29 | |
| | | | at 70 | 17 | Mud. | at 70 | 30 | | at 70 | 34 | Mud. |
| | | | | | | at 80 | 13 | | at 80 | 25 | |
| | | | | | | | | | at 90 | 17 | |
| | | | | | | | | | at 100 | $10\frac{1}{2}$ | |

The Island Mypurra, or True Point Palmiras, I make in lat. 20° 41′ N., lon. 87° 13′E.
The Tail of the Western Brace, in 9 fathoms, lies in lat. 21° 9′ N., lon. 87° 47½′ E.
The Tail of the Western Sea Reef, in 9 fathoms, is in lat. 21° 0′ 30″ N., lon. 88° 2½′ E.
The Tail of the Eastern Sea Reef, in 9 fathoms, is in lat. 20° 58′ N., lon. 88° 21½′ E.*
The Tail of Sagor Sand, in 9 fathoms, is in lat. 21° 0′ N., lon. 88° 37′ E.

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## STORMS IN AND NEAR THE HOOGLY, WITH SOME ACCOUNT OF THE TIDES AND THE BORE OF THAT RIVER.

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Storms at the head of the bay.

EXCLUSIVELY OF HARD GALES, which blow at times against the shores that form the head of the bay, between the month of April and the end of August, when the S.W. monsoon prevails with most force, short gales, or storms, are liable to

* These longitudes are thought to be 8 or 9 miles East of the true situations.

happen at other times. Gales which prevail during the S.W. monsoon, blow sometimes from S.S.E., but more frequently between South and S.W., veering at times to the westward. Gales from southward, in some years, have been experienced late in September, October, November, and sometimes, though seldom, in the early part of December.

August, 1814, a storm happened in the head of the bay, in which several ships were disabled; one of them, the Eliza, Captain Roberts, was obliged to put into Coringa to repair her damage.

September 29th, 1807, the Company's ships Ceylon and Walpole met with a severe storm, which commenced at S. E., shifted to N.E., N.N.W., blew a hurricane at West, then moderated at S.W. and S.S.W. The Ceylon, at anchor in 16 fathoms, in Ballasore Road, cut her cable, went to sea, and had a suit of sails blown away. The Walpole was in 46 fathoms water off Point Palmiras, lost her mizen-mast, and sustained other damage in the gale; on the following day, she fell in with the Lady Barlow, country ship, totally dismasted.

October 23rd, 1810, the Indus, in 18 fathoms water off Point Palmiras, lost her sails, and had a boat washed away by an easterly gale; the wind afterward veered to N.W., and enabled her, and other ships in company, to stretch off shore.

Late in September, 1812, the Mysore lost her anchors and main-mast, and sustained other damage in a storm, at the tails of the sea reefs.

The Montague, in 1708, carried from abreast of Achen Head S.E. and E.S.E. winds to lat. 13° N., where, on the 10th November, a dreadful storm blew away her top-masts; they were also obliged to cut away the mizen-mast, and with three pumps could scarcely keep her free.

North-westers.

NORTH-WESTERS are liable to happen near the entrance, and in the River Hoogly, about the changes of the monsoon, particularly in April and May, also in October, November, and sometimes in December. These are sudden severe gusts of wind from the N.W. quarter, generally indicated by a dense cloud rising rapidly from the horizon, accompanied at times by lightning. The violence of some of these north-westers is excessive and instantaneous; I have seen all the ships moored at Calcutta driven on shore by one of them, in May, 1784, and for a short time it was impossible to walk in the streets. They are, however, seldom so violent, particularly at the entrance of the river, although on the night of the 5th of December, 1803, about eight ships riding there, on the look-out for pilots, lost anchors, during a gale blowing directly out of the river, with lightning and small rain; whilst a heavy sea rolled in from the opposite direction, occasioned by a strong gale in the bay blowing from the southward at the same time, and reaching within 30 leagues of the sea reefs.

Tides.

THE TIDES in Channel Creek are not strong, but in the River Hoogly they run with great rapidity on the springs, sometimes above 7 miles an hour between Sagor and Calcutta, but not so strong in the channels outside. They flow highest during the S.W. monsoon, the rivers being swelled by the rain which falls in the interior, and an accumulation of water impelled against the shores by the strong southerly winds adds to the rise of the tides in this season; whereas, the northerly winds blowing from the land in the N.E. monsoon facilitate the progress of the water from the rivers; for then, the quantity of water is less, with a smaller rise and fall of tide, than in the S.W. monsoon.

This is also the case on the south coast of China, and on all the coasts of India to the northward of the equator, which are open to the South and South-westward.

Caution during the night.

Persons unacquainted should be careful when passing between Calcutta and the lower parts of the river in boats *during the night*, for many lives have been lost through the apathy and neglect of the country boatmen, in running foul of vessels anchored in the stream, when by the rapidity of the tides the boats were immediately overset or broken in pieces. To avoid an accident of this kind, it is prudent, in proceeding upward with the flood, to keep near one of the sides of the river, out of the track of ships or large vessels which happen to be at anchor.

Tides.

At Calcutta, it is high water about 3 hours on full and change of the moon, the difference of time between it and the tail of the Eastern Sea Reef that makes high water being $5\frac{3}{4}$ hours; so that it is nearly high water at the former place, when it is low water at the sea reefs.

Description of the Bore.

THE BORE, in the River Hoogly, is occasioned by the rain in the country imparting greater velocity and duration than usual to the tide of ebb, to overcome which, an excessive effort is made by the first of the flood, producing that sudden and abrupt influx, called the Bore. It is seldom perceptible in the N.E. monsoon, except when the tides are higher than usual; but about the equinoctial tides, in March, it is at times high and dangerous. From May to October, when the river is greatly elevated, the Bore frequently prevails for several days at the height of the springs; it is first discernible on the Diamond Sand, below Diamond Harbour, and becomes more conspicuous on the sands at Hoogly Point, a few leagues further up, where it meets with great resistance by the sudden bending of the river to the westward: from thence, it runs high over all the principal sands as far as Hoogly town, distant near 70 miles, employing hardly 4 hours to travel this distance, and its general velocity is nearly 20 miles in the hour. On the sands contiguous to the banks of the river, the Bore rises in a large wave, sometimes 12 or 15 feet perpendicular, and rolling along with great noise as the harbinger of the flood tide, carries every floating body along with it, and will overset any boat or small vessel that may happen to be on the sands, or in shoal water near them. It is discernible in the day at a considerable distance, and the roaring noise indicates its approach in the night, when instantly all boats in shoal water should quickly pull farther out into deep water for safety, where the waves do not break, the water being only much agitated with a confused swell.

Very dangerous to boats in shoal water.

At Calcutta, the shore is steep, with deep water near it; here the boats do not all leave the shore when the Bore is approaching, but the people stretch a rope upon the land and haul them as far in as possible, when they are lifted up by the great swell of water occasioned by the Bore, which at times rises instantaneously to the high water mark* of neap tides.

Europeans should be cautious in the night, if they are upon the river, or crossing it in boats near low water spring tides, when the Bore is liable to happen; they ought to keep in deep water, for if it approach when they are aground on any of the sands, or in shoal water near them, they will be in the greatest danger of perishing. Mr.

* When the Bore impels the sudden swell of water upon the land, and having reached its utmost impetus, the swell rushes backward with great violence, nearly to low water mark. A ship of 300 tons burthen was hauled on shore at Calcutta in September, 1785, to have her bottom cleaned; although the ground was dry around her to a considerable distance at low water, when the Bore came the swell nearly floated her, and in its violent reflux threw her on the opposite side, by which several of the floor timbers were broken.

Thomas, of the Fox, proceeding in a burr from Calcutta to Kedgree with the commander's baggage, was drowned by the carelessness of the people getting the burr into shoal water, when the Bore overset her, and every thing was lost. Captain Haig, of the Company's ship Woodcot, perished by the Bore late in the evening, in the act of leaving the shore opposite to Calcutta in a boat, to cross over to the city; and many other persons have suffered in open boats, during the night, by this destructive phenomenon.

The draught of water for ships departing from Calcutta to proceed down the river is usually limited to 17 feet; but the pilots will, for a gratuity presented to them, sometimes take charge of ships drawing $17\frac{1}{2}$ or 18 feet; and if a powerful steam tug be employed, they may be taken from Calcutta drawing 19 or even 20 feet, when the tides and weather are favourable.

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## COAST OF BENGAL, FROM CODGEE DEEP TO CHITTAGONG, AND THE INTERJACENT RIVERS.

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THE COAST OF BENGAL, from Hoogly River to the principal mouth of the Ganges, is all very low, without any distinguishing marks; and the country is a level woody plain, generally called the Sunderbunds, from a kind of timber very plentiful here, called Sundry. The low country, or *Delta of the Ganges*, is intersected in various directions by numerous small branches of that great river and other rivers, many of which communicate together by lateral branches, and most of them are discharged by wide channels into the sea. Coast of Bengal.

ROYMATLA, or MUTWALL RIVER, about 30 miles to the eastward of Sagor, separated from Jumerah River and the Island Codjee Deep by Bulcherry Island and flats, is above a league wide at the entrance, the channel stretching N. by W. and S. by E. About 10 miles from the land the depth is 3 fathoms at low water, with a gradual increase to 9 or 10 fathoms at the entrance; and the southern extremity of the land that bounds it on the east side is in lat. 21° 29′ N., having a very shoal bank extending from it a great way to seaward. Roymatla or Mutwall River.

This river branches out into several ramifications at different distances from the sea; the westernmost of these, called Bogybogie, for a considerable way, extends to the salt lake near Calcutta, having never less water in it than 3 fathoms: a ship of considerable burthen might enter Mutwall River, and with the assistance of a boat a-head to sound she could proceed to Taida, a village close to the salt lake.

Bulcherry Island, on the west side of the entrance, is large, separated from the other land only by a narrow creek.

BANGADOONY RIVER, the next to the eastward of Mutwall, and about 3 leagues from it, is small, with tolerably deep water at its mouth, and the course of the channel to seaward is about S.S.E. It takes this name from an island which separates the Bangadoony River.

entrance from Gua-Suba River, the next in succession to the eastward. A vessel of considerable burthen might pass to the northward of Bangadoony Island, and moor between it and a small island in the passage, sheltered from all winds.

Gua-Suba River.

GUA-SUBA RIVER is of considerable size, but the most difficult to enter of any on the coast, on account of the bending channel at its mouth. A vessel, to enter it, must bring the middle of the land on the east side of the river to bear North, and steer directly in for it until near the shore; she ought then to steer to the westward until close to Bangadoony Island, from whence the channel takes a direction right up the river.

Roymongul and other Rivers.

ROYMONGUL ENTRANCE, about 3 leagues to the eastward of Gua-Suba River, and 18 leagues from Sagor Island, receives, about 2 leagues from the sea, the united streams of three rivers, Harribanga the westernmost, Roymongul the next, and Jubunah the easternmost. The point of land on the west side the entrance is in lat. 21° 37′ N., with 8 and 10 fathoms in the channel close to it, and 12 fathoms inside towards Harribanga River; from the point to seaward, the depths decrease gradually to 4 fathoms in this Western Channel, which lies nearly North and South, and the outer part of it is separated from that of Gua-Suba by the extremity of the sand that stretches out from the land between them. The Eastern Channel leads directly to the entrance of Roymongul and Jubunah Rivers, having a sand between it and the Western Channel; it is a large channel with deep water inside, stretching nearly S. by E. to seaward, the depths decreasing gradually to 4 fathoms in that direction; and this is one of the most considerable openings on the coast, and forms a good harbour. It is high water in the entrance of Roymongul River at 11 hours 30 minutes on full and change of moon.

Tides.

Mollinchew, and Burrapungah Rivers.

MOLLINCHEW RIVER, about 2 or 3 leagues eastward from Roymongul entrance, has a channel stretching in a S.S. Westerly direction to seaward, with 7 or 8 fathoms near the land, decreasing to $3\frac{1}{2}$ or 4 fathoms. A few miles farther to the eastward is BURRAPUNGAH RIVER, having a narrow channel, and is separated from the former by Putnay Island, which projects between them to seaward.

From this island an extensive reef and flat stretches out $3\frac{1}{2}$ or 4 leagues, on which the ship Falmouth was lost in 1766.

Directly South from Roymongul and Mollinchew Rivers, the Swatch of No-ground is situated, already described under the head of "Directions for approaching the River Hoogly."

Murjattah River.

MURJATTAH RIVER, situated $2\frac{1}{2}$ or 3 leagues to the eastward of Putnay Island, and 24 leagues from Sagor, is wide at the entrance, the channel stretching from the land on the east side nearly S. by W., shoaling gradually from the land to 3 or $3\frac{1}{2}$ fathoms outside. About 4 or 5 miles inside the entrance of the river, two islands, called the Paravangah Islands, are situated, and on the southernmost, there is said to be a tank of fresh water. On the reefs bounding the channel leading to this river, in about lat. 21° 30′ N., the Berkshire was lost in 1771.

Bangarah River.

BANGARAH RIVER, about $3\frac{1}{2}$ leagues E.N. Eastward from the former, and much smaller, has a channel stretching about South from the point of land on the west side, with depths from 5 and 6 fathoms, decreasing outside to $3\frac{1}{2}$ or 3 fathoms. About half-

way between this river and that of Murjattah, another small river falls into the sea, and is only a branch of the former, which all communicate with each other.

HOORINGOTTAH RIVER, situated about 5 leagues to the N. Eastward of Bangarah River, and 33 leagues to the eastward of Sagor Island, has a very spacious entrance, about 3 leagues wide, between the two great banks or shoals which form it. These project from the land on each side of the river about 5 leagues to seaward, or to lat. 21° 30′ N., having 3 or 3¼ fathoms hard ground in this latitude on their extremities, and shoaling gradually to 2 and 1½ fathoms farther in towards the land. The westernmost of these, called Argo Flat, has 3½ fathoms on its extremity, in lat. 21° 30′ N., lon. 90° 0′ E., and the Western or Great Channel leading into the river is on the east side of this flat, in a S. by E. line from Tiger Point, which point bounds the west side of the river's entrance. Hooringottah River.

The depths in the entrance of the channel, in lat. 21° 31′, to 21° 33′ N., are nearly the same as on the tails of the sands, from 3 to 3½ fathoms at low water, and in some places rather hard bottom; but after getting a little farther in, the depths gradually increase over a soft bottom to 5, 6, 7, and to 8 and 9 fathoms abreast of Tiger Point.

About 5 or 6 miles inside the tails of the reefs lies the south end of an extensive sand, called Heroine Reef, which extends northward into the river, separating the channel into two branches, but the easternmost is narrow and shoal, and bears due South from the point of land that forms the east side of the river, called Landfall Point. When within 7 miles of Tiger Point, there commences a Middle Ground, by which a Middle Channel is formed between it and the Heroine Reef, with from 3 to 3½ fathoms water, but it is narrow, the Great Channel on the west side of the Middle Ground being the only safe passage for large ships.

Unless the longitude, or the relative distance from Sagor Island, is correctly known, it might be difficult to find the entrance of Hooringottah River, as the land will not be discerned till a ship has entered into the channel a considerable way between the sands. But if a ship happen to sound in the Swatch of No-ground, it will be a tolerable guide to direct her to the entrance of that river, observing, that from the N.E. angle of the swatch, the southern extreme or tail of Argo Flat bears E.N.E., distant about 7 leagues. When this flat is approached, and a ship certain of her position, she ought to steer about N. by E. or North along its eastern side, or in working up with the flood tide she may make short tracks from it to the eastward, till Tiger Point is seen, then keep it bearing N. by W., which will lead her up in mid-channel, or keep it between N. ¾ W. and N. by W. ¼ W. with a turning wind.

It must be observed, that Landfall Point, on the east side the river, being 6 miles farther South than Tiger Point, will be seen before it; and probably also the land on the western shore, which stretches about S.W. by S. from Tiger Point, and afterwards W.S.W. towards Bangarah River; but Tiger Point is the eastern extremity of the land that forms the west side of the river, by which it will be easily known. A ship may pass this point within half a mile, also Buffalo Point, about 1½ miles N. by W. from it, she may pass at the same distance: about 5 miles farther to the N.N.W. lies Puncah Point, the south extreme of Puncah River, which may be passed at 2 miles' distance, and when it bears West, haul over to Deer Point on the eastern shore, as Puncah Shoal occupies all the space fronting the river of the same name within half a mile of the eastern shore. Having crossed over to Deer Point, a ship may then keep close to the eastern shore, in proceeding up to Nash Harbour, at the entrance of Bomany Creek, which is in lat. 22° 11′ N., about 3 leagues to the northward of Deer

Point. Betwixt these places, Mack Shoal occupies the middle of the river, having a channel on each side of it close to either shore; but that close to the eastern side of the river is preferable, being wider than the other, and having from 10 to 6 fathoms water.*

Tides.

At the entrance of Hooringottah River it is high water about 12 hours on full and change of moon, and the tide runs very strong on the springs.

The rivers which disembogue into the Hooringottah pass through a part of the country abounding in rice, which is here purchased on very moderate terms: ships, therefore, have sometimes proceeded to this place, and loaded with grain for the Coromandel coast, when the prices were high at Calcutta. The Cartier and other ships, which loaded in Hooringottah River, were from four to five hundred tons burthen. A ship being about to enter it, or any of the rivers along this coast, ought to keep a boat sounding, to trace out before her the soft bottom in the proper channels, as they are imperfectly known, little frequented, *and liable to alter*, by the freshes running out against strong winds and a heavy sea during the S.W. monsoon.

Caution in entering the rivers.

Captain J. Ritchie was sent to survey the coast and rivers between Sagor and Chittagong, on account of a ship having been driven on it by a southerly storm, and judiciously observes nearly as follows.

Capt. Ritchie's Observations.

Every navigator proceeding to this coast, or being driven towards it by accident, *ought to remember*, that the whole of it, when first seen from a ship at sea, has the appearance of a range of low islands covered with trees, and that the ground between the ship and them is a sloping bank, with very little water on it, near the land. That the bank is cut through by a channel between each island, that these channels are variously situated, having each a different course, but that all have a soft bottom, with an increasing depth of water towards the land. When the coast can be seen from the deck, the depth of water is in general about 3 fathoms at low water, and very few places have much more or less; the bottom at this distance is mostly stiff ground. If a ship be in a channel, as she draws nearer the land, the ground will become very soft, with an increase of depth; if not in one, the ground will suddenly become very hard, and the depth decrease; and should this be the case, she ought immediately to haul to the eastward or westward as the wind may permit, until the ground become soft, and there is no doubt that the depth will increase at the same time. Whenever the ground is found to be quite soft, a ship may steer for the opening without fear; as she enters it, what appeared to be an opening between islands, will be found in reality the entrance of a river.

The coast not being inhabited, it is from the salt works interspersed along it in some places that those who have the misfortune to be driven upon this coast in tempestuous weather may expect relief, either of boats or of men, to pilot them to the inhabited country. The people employed on this business have the general name of Mollingaho, and are a quiet, harmless race of men. A small supply of fresh water and a little rice may be got from them, which is their principal food, the few fowls they have being sacrificed to Gaugie Sahib, the god of the woods, for protecting them from tigers or other wild beasts. Many of these fowls stray from the Salt Churrs, become wild, and sometimes fly over the rivers; hence, the crowing of cocks in the woods is often heard, which should be no inducement for persons unacquainted to go into the woods in search of people; they ought also to beware of going ashore at the Salt Churrs in the

* These directions for the Hooringottah River are taken from an excellent survey of that river made by Captain Malcolm M'Kenzie during his voyage there, and obligingly communicated to me by that navigator.

night, for both the royal tiger and leopard are on the watch there, and often cover all the ground over at night, as may be seen by marks of their feet.

RABNADAB ISLAND, the southern extremity, is in about lat. 21° 50′ N., and 6 or 7 leagues to the eastward of Hooringottah entrance; this island is large, with a channel on each side; the westernmost, extending from the west side of the island about S.S.W., is narrow, but thought to have 3 or 3½ fathoms water. The other, on the east side, is supposed to contain nearly the same depths, but shoal water extends a great way to seaward.* Rabnadab and other islands.

To the north-eastward and eastward of Rabnadab is a group of islands, called Donmanic Islands, and to the northward of these, the *principal* mouth of the GANGES empties itself into the sea by several channels. Between this mouth of the river and the coast of Chittagong, the gulf is very shoal, and imperfectly known. The northern part of it is occupied by the large island Decan Shabazpour, which separates the mouth of the GREAT RIVER MEGNA from that of the Ganges; but to the northward of it, these rivers communicate, and form several smaller islands. Betwixt Decan Shabazpour and Hattia, the next island to the eastward, there are other smaller islands, the southernmost of which fronting the sea, called Moncoorah, is the largest. In the N.E. part of the gulf, to the eastward of Hattia, are the Islands of Bominy and Sun Deep, near the main land; these are large, particularly the latter, which is the outermost. The River Megna joins the sea by the various channels formed between these islands, some of which are but imperfectly known. In September, 1822, this river overflowed its banks, inundated the adjacent Islands Hattia, Decan Shabazpour, &c., whereby many of the cattle and inhabitants perished.

SUN DEEP extends from lat. 22° 20′ N. about 6½ leagues to the northward; it is a fertile island, abounding with cattle, but free from tigers and other wild beasts which infest the neighbouring continent. From the south end of the island a shoal projects about 2½ leagues to seaward, having a channel with 3½, 4, and 5 fathoms water along its western edge, leading to the principal town on the west side of the island, situated about a mile from the shore, known by a remarkable tree near it, and a grove of palm trees. To the southward of the town there is a creek, having 4 fathoms in it at low water; this was a safe harbour forty years ago, but is difficult to enter with the flood, as a ship may be set on the north point of the entrance, the direction of the creek being to the S. Eastward. The best time to enter it is with the latter end of the ebb, and the first of the flood will set a vessel directly in; but probably this place, like Bominy Harbour, may be no longer navigable. Sun Deep.

The channel on the east side of Sun Deep, between it and the main, leads to Bominy Harbour, and is 5 or 6 miles wide in the southern part, and forty years ago had depths from 5 to 7 fathoms, when ships bound to that harbour, after bringing the north end of Sun Deep to bear West, used to haul within a mile of the main, and steer along it at that distance, keeping in 7 and 8 fathoms until they opened the east point of Fenny River; they then hauled over to the westward for Bominy Island, where, in 5 fathoms at low water, they were sheltered from all winds. To proceed to Bominy Harbour.

It is high water in Bominy Harbour at 2½ hours on full and change of the moon.

The whole space between the meridians of Rabnadab Island and the east end of Sun Deep has not been particularly examined to the northward of lat. 21° 30′ N., it would, The N. Eastern angle of the bay not well explored.

* The Dove, Captain Duffin, was wrecked about 30 years ago on the sands which project from this part of the coast.

therefore, be imprudent for ships to exceed much that parallel between these meridians; for there the water is generally shoal, and in about lat. 22° N. there is said to be two banks, on which the sea breaks in blowing weather, one of them $5\frac{1}{2}$, the other 9 leagues from the coast of Chittagong. On this account, a ship departing from the river or road of Chittagong ought to steer to the southward nearly to lat. 21° 30′ N., before she haul much to the westward across the head of the bay.*

In lat. 21° 30′ N., almost the whole breadth of the head of the bay, it is high water at 11 hours on full and change of moon; the difference in time for every 20 miles of latitude is 1 hour in the open sea, and the general direction of the flood is to the northward; by attending to this, the time of tide may be always known when in soundings.

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## MONSOONS AND CURRENTS IN THE GULF OF BENGAL.

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Winds in the Bay of Bengal in February.

THE WINDS on the coast of Coromandel begin in February to draw to East and S. Eastward: the N.E. monsoon then becoming faint, land and sea breezes often happen, particularly in the latter part of the month, and early in March, gentle breezes between N.W. and West blow frequently from the land after midnight until morning, which are generally followed by calms or faint variable airs, until the S. Easterly breeze comes from the sea about noon. These land and sea breezes do not always happen in February, for Easterly and N.E. winds then prevail sometimes until March; but they are often interrupted by southerly breezes or other changes. About the middle or latter part of February, brisk winds between S.E. and S.W. happen at times, at a considerable distance from the coast, by which some ships have made a passage from Tranquebar or Madras to Bengal in seven or eight days. In the middle and eastern parts of the bay, the N.E. monsoon prevails in this month, generally with settled weather and a clear sky, and it is considered throughout the bay to be the finest month in the year.

In March.

The S.W. monsoon may be said to commence in March upon the Coromandel coast, for the breezes from the sea in the afternoon draw them well to the S. Eastward, and the land breezes frequently to S. Westward. N.E. and Easterly winds also happen in this month along the coast, but those between E.S.E. and S.W. usually prevail; the same winds are frequently experienced well out from the land, often light and variable. In the middle, and along the east side of the bay, light northerly winds between N.E. and N.W. are mostly experienced during this month, and at times, considerable breezes from S.W. and Southward; very faint airs and calms are also liable to happen in March, which is generally a pleasant month, with fair weather in most parts of the bay.

* Since Captain J. Ritchie's examination of the channels and sands between Sagor Island and Chittagong, it has been observed by Captain Maxfield and other persons, that the tails of the sands have increased their distance from the land, as they are now found to extend farther to the southward than represented on the old charts, occasioned by the soil being torn away, and carried down the rivers during the freshes, gradually forming alluvial land. From the same cause, it is now said, that Bominy Harbour and the channel between Sun Deep and the main are filled up so much as not to be navigable by ships.

In April, the sea breezes on the Coromandel coast commence from S.S. Eastward about noon or earlier, and continue until 9 or 10 P.M.; or at times during the night. After midnight, the wind frequently veers to S.S.W. and S.W., but seldom blows directly from the land until May, when the land and sea breezes both become more open and regular. In April.

These winds prevailing in April between S.S.E. and S.S.W. or S.W., with a strong current to the N. Eastward, make it almost impossible for ships to work along the coast to the southward, particularly if they do not sail fast. About the Nicobar Islands and near the east side of the bay, light easterly winds are generally experienced all the month of April, often veering to N.E. and N. Westward, with intervening faint variable breezes and calms. In the middle of the bay, the prevailing winds in this month are variable, mostly from the southward.

In May, the winds on the Coromandel coast prevail mostly between E.S.E. and S.W.; the breeze generally sets in about noon from seaward, blowing strong from S. Eastward until the evening, and sometimes till midnight; afterwards it veers to South and S.W., where it continues during the morning. Calms or faint airs often intervene between the land and the sea breezes, at other times the wind veers from the one to the other without abating much of its strength. Sharp squalls from N.W. sometimes blow off the land in May, accompanied at times by showers, with lightning and thunder. In May.

Late in April, or early in May, the S.W. monsoon becomes general about the Nicobar Islands, and in the eastern side of the bay, where it is much later than in any other part.

A STORM is liable to happen on the Coromandel Coast in April, or even in May; but fortunately many years pass over without a storm in either of these months, for they blow with great fury. Storms are generally preceded by a heavy swell rolling in upon the shore, and commence at N.N.W. or N.N.E., veering to N.E. and East, where they blow hardest, with much rain and a high sea, and afterwards abate when the wind veers to E.S. Eastward. They sometimes do not end in this quarter, but blow with great violence from Eastward, shifting suddenly to S.E. or S., and with great fury ending at S.W.; when this happens, which is seldom, these tempests are exceedingly severe. Storms.

His Majesty's ships Namur, Pembroke, and Apollo hospital ship, were lost at Fort St. David's in April, 1749, during one of these violent storms. On the night of the 19th May, 1787, a severe tempest extended along great part of the coast, very destructive to the shipping and to the country. At Coringa and Jaggernautporam the sea rose much above its natural level, and with an overwhelming wave inundated the low country, destroyed the vegetation, many of the villages, thousands of the natives, and numerous herds of cattle. This was considered a singular case, for a tempest seldom happens in May, or even in April, although the latter is reckoned a precarious month on the coast. Almost all the gales on this coast commence at N.N.W., or from the northward; ships should, therefore, proceed to sea with these winds when a storm is apprehended, to get an offing before the wind shifts to the eastward, where it generally blows with the greatest violence from the sea.

It has been already mentioned, that on the 4th of May, 1811, a storm did great damage at Madras; and other storms have been experienced in the same month since that time.

In June, July, and August, the S.W. monsoon blows strong throughout the bay, Winds in June,

July, and August. with cloudy weather, and much rain at times; the winds veer to West and N.W., frequently blowing in squalls for several hours together, particularly in the north part of the bay. On the Coromandel coast, strong land and sea breezes are frequently experienced in these months; the latter, after noon, generally commences at S. Eastward, veering to the southward in the evening, and continuing from that direction great part of the night. In the morning, the wind veers to S.W., and sometimes to West, then becoming a strong breeze from the land: these land and sea breezes are not always regular, for the land winds in June and July, at times, blow strong for one or two days together, veering only to the southward in the afternoon; at other times, the S. Easterly breezes predominate.

Storms in June. The weather is generally favourable on the coast of Coromandel in these months, but it is the stormy season in the northern and eastern parts of the bay; for there the S.W. winds blow strong towards the land, with much rain. June is considered a very dangerous month on the coasts of Bengal and Aracan, for severe storms are liable to happen in that month about the full or change of the moon. Many ships, after leaving the River Hoogly in June, and others that have arrived in its vicinity, have foundered with their crews at different times; for few years pass over without a storm happening in that month in the northern part of the bay.

Winds in September. In September, the S.W. monsoon is generally moderate all over the bay, with W.N.W. or N.W. winds at times:—the prevailing winds in this month, on the Coromandel coast, are southerly, the sea breezes from S. Eastward and those from the land very variable between S.W. and N.W.; although the winds are generally moderate in this month, with settled weather, yet towards the latter end of the month, gales have sometimes happened near the entrance of the River Hoogly, in which several ships have been dismasted.

N.E. monsoon. THE NORTH-EAST MONSOON, on the Coromandel coast, generally commences in October, mostly between the middle of that month and the 1st of November. Although October is considered a very dangerous month on that coast, the winds continue often light and variable with fine weather, until near the end of the month; but more frequently about the middle of the month the weather becomes gloomy and threatening, prior to the setting in of the N.E. monsoon.

Storms. This monsoon is liable to commence with a severe storm, which usually begins at N.N.W., or from the northward, and veers afterwards to N.E. and Eastward; sometimes it begins at N.Eastward, and in the middle or eastern parts of the bay, at times, from S.W. or Westward.

These storms are liable to happen between the 10th October and the 10th December, a period in which the shipping at anchor on the Coromandel coast have sometimes suffered greatly, for the wind blows with great violence towards the shore from the eastward in these storms; and on the coast of Aracan, equally strong upon the land from the westward.

In some years, a storm has been experienced so late as January, but these are generally partial, confined to the vicinity of the southern part of the Coromandel coast and the N.E. part of Ceylon.

In the northern part of the bay, the N.E. monsoon begins early in October, in some years; in others, not until the end of that month, or early in November; but in the central and southern parts of it, between the Coromandel coast and Nicobar Islands, and thence towards Ceylon, westerly winds frequently prevail more than any other, in both these months. These winds are sometimes light and variable, between N.W.

and S.W.; when they become brisk, and veer to S.W. or S.S.W., they often reach far to the northward into the bay.

The Warren Hastings had southerly winds from lat. 16° N. until she anchored in 9½ fathoms, in sight of the Floating Light Vessel, 16th October, 1822; but not seeing any pilot vessels, and a gale commencing, with a fall of the barometer from 29·37 to 28·96 on the 18th, she cut her cable, and stood out to sea. Her main-sail, main-top-sail, main-try-sail, and main-royal-pole, were blown away, one boat washed off the quarter, the other quarter boat stove and blown in board, with other damage; besides, her cutwater started from its place about 3 inches in the gale.

To the northward of lat. 17° or 18° N., the winds are often very light in the N.E. monsoon, sometimes inclining at N.E., but more frequently between N.N.E. and N. by W. Calms and faint airs prevail much in the north part of the bay, particularly in soundings along the head of it, and along the coast of Aracan, during the whole period that the N.E. monsoon predominates in the open sea.

Prevailing winds during the N.E. monsoon.

In November and December, on the Coromandel coast, the wind blows mostly from N N.Eastward, sometimes accompanied with showers of rain; in the morning, it veers at times N.N. Westward, inclining a little from the land, and in the afternoon a little from seaward; but it frequently blows steadily along shore for several days together, without any variation, with a considerable swell, and a great surf rolling upon the shore.

From the middle or latter part of November until March, the prevailing winds out in the open sea are between N.N.E. and E.N.E. throughout the bay, accompanied with clear settled weather; but short intervals of variable winds, from S.E., South, or S. Westward, are sometimes experienced in these months, when the N.E. monsoon predominates. On the eastern shores of the bay there are land and sea breezes in this season, although the coast of Aracan is subject to frequent calms, or faint airs, and N. Westerly winds. Between the Andaman Islands and Junkseylon, southerly winds and cloudy weather, with rain, are at times experienced in December and January.

In January the weather is usually favourable, with steady N. Easterly winds in most parts of the bay; on the Coromandel coast they draw to E.N.E. in this month, during the day, and blow along shore to the southward, or incline a little from the land in the mornings; but sometimes, in January and December, the N.E. winds continue for three or four days together, without much variation in direction or force.

In February the N.E. monsoon ends on the Coromandel coast; the weather is then favourable, and southerly winds commence about the latter part of this month, or early in March.

Light southerly winds at the head of the bay.

THE SOUTH-WEST MONSOON is preceded by southerly and S.W. winds, which generally commence about the entrance of Hoogly River, off Point Palmiras, and along the northern part of the coast of Orixa, about the latter part of February, or early in March; but not so early on the N.E. side of the bay.

Along the head of the bay, in the vicinity of the sands and rivers from December to March, or until the southerly winds set in strong, there are frequent light airs and calms, with a very smooth sea. These calms, or faint airs, are liable to happen day or night, but the breeze generally fails with the setting sun, and a calm continues in the first part of the night. About midnight, a gentle breeze often commences at S.E. or southward, veering gradually to W. and N.W. in the morning, and continuing this

circular course, increases in strength from the northward about 8 or 9 A.M., with the rising sun.

S.W. Monsoon, or stormy season.

Towards the end of March, or early in April, the southerly or S.W. winds begin to set in regular and strong, with cloudy weather, and sometimes rain; but the stormy weather of the S.W. monsoon, with hard squalls and much rain, is seldom experienced until about the middle or latter part of May, and it continues until September. In June and July is the worst weather, for towards the middle of August it is sometimes fair for several days together, although hard gales have also been experienced in this month, in some seasons. In September, the S.W. monsoon being on the decline, the weather is usually moderate and cloudy, with little rain; towards the latter part of this month, or early in October, the southerly winds fail, and are followed by variable breezes; and sometimes a storm is experienced all over the bay in September or October, previous to the setting in of the N.E. monsoon.

Currents in the N.E. season.

THE CURRENTS, in the early part of this monsoon, generally set to the S. Westward in the northern part of the bay; and near the coast of Aracan, Southerly or S. Easterly currents prevail more than any other, throughout the season. In the open sea, well out from the coast, there is seldom any southerly current, but generally a drain to N.W. or N., and sometimes to N. Eastward.

Currents near the entrance of Hoogly River.

The current on the coast of Orixa sets to the N.E. towards the entrance of Hoogly River, after the commencement of southerly winds in February or March; about the middle of July, the freshes from the rivers, occasioned by the rains, generally produce a current setting round Point Palmiras to the southward; after which, a small drain is often found to set to the S. Westward until January following.

Off Point Palmiras, the tides are often weak on the neaps, but of considerable strength on the springs; the flood sets round the reef along the coast into Kannaka Bay, but at the distance of a few leagues from the reef the flood sets N.E. and N.E. by E. in the S.W. monsoon.

A ship, therefore, passing the reef at a great distance, will be set to the eastward; and when near it, will be set by the flood to the N. Westward into Kannaka Bay.

Current in the S.W. monsoon.

The current on the Coromandel Coast, particularly on the southern part, begins to run to the northward late in January, or about the beginning of February, with the first of the southerly winds, but is strongest in April or May, when the wind blows more steadily from southward. After May, the northerly current gradually abates in strength, but it continues to set along the coast until the middle of October, though very weak at times, during this period; it has sometimes been experienced to set to the southward.

In the middle of the bay the current in March and April is mutable, and seldom strong, between the Coromandel coast and Nicobar Islands, and about the entrance of Malacca Strait, it sets often to the S. Westward; in the northern part of the bay it sets mostly to the southward in March, but more frequently to the northward in April.

From April, the current sets generally to the North or N. Eastward all over the bay in the open sea, until the early part or middle of October; during this period it is not always constant, but governed in its direction and strength by the prevailing winds; on the eastern side of the bay, and about the entrance of Malacca Strait more particularly, it sometimes sets to the southward. When the S.W. monsoon blows with more strength than usual in the middle and northern part of the bay, the velocity of the current is greatly augmented to the N. Eastward.

The current begins to set along the coast of Coromandel, to the southward, in October, sometimes about the middle of the month. Near the end of this month, or early in November, it begins to run very strong to the southward; in November and December it runs frequently in soundings near the land, from 2 to $2\frac{1}{2}$ miles an hour. Current in that season.

At the distance of 2° or 3° from the coast, and in the middle of the bay, when N. Easterly winds begin to blow strong after the middle of October, or in November, the current generally runs with the wind to the S. Westward, but unless the N.E. wind prevail with force, the current is frequently very changeable; for in these months it sets sometimes to the southward, at other times to S.W. and N. Westward.

In January the southerly current abates on the coasts of Coromandel and Orixa, for in the latter part of this month, or in February, it sets usually to the northward along the southern part of the coast, but there is seldom much current in the middle of the bay; and in these months it frequently sets to the N.W. or Northward, when the distance from the coast is considerable.

About the Nicobar Islands, and betwixt them and Junkseylon, the current in the N.E. monsoon often sets strong to the N.W., and sometimes to the Northward; on the Coast of Aracan it sets usually to the southward, but at times to the northward; although close to the shores of this coast, and of all those bounding the east side of the bay, there is generally a kind of regular tides, when the weather is settled in the N.E. monsoon.

The period of the currents or monsoons changing in the Bay of Bengal is not always the same; for here, as in most places of the Indian Seas, these changes happen in some years nearly a month sooner or later than in others.

TIDES :—At the mouth of Murjattah River, situated nearly half-way between Point Palmiras and Chittagong, the flood sets due North, but between it and the mouth of the Ganges and Megna Rivers, as the distance to the eastward is increased, the more the flood sets to the eastward of the north point. In like manner, between Murjattah and Hoogly Rivers, the tide inclines to the westward of North, and the latter part of the flood sets nearly West. Tides along the head of the bay.

At the tails of the Eastern and Western Sea Reefs, and a little outside of them, it frequently happens, in the N.E. monsoon, that the tides set constantly to the westward; the ebb running about S.W. $1\frac{1}{2}$ and 2 knots on the springs, continues 7 hours, then abating a little velocity, changes gradually to West; and this is the flood tide, which is weaker, runs a much shorter time than the ebb, and seldom sets more to the northward than W. by W.N.W. On advancing a little farther up the channel, between the Eastern Sea Reef and Sagor Sand, the flood takes a direction more northerly, in the plane of the channel, and the ebb in the opposite line.

These westerly tides or currents, about the tails of the Sea Reefs, combined with faint breezes and frequent calms, retard greatly all those ships from reaching the Eastern Channel, which, by adhering to directions given when the western route was followed, have run to leeward into Ballasore Road to look for pilots.

# PASSAGE TO BENGAL FROM THE SOUTHERN PARTS OF THE GULF.

Passage towards Bengal.

TO SAIL from the Coromandel coast or other southern parts of the bay toward Bengal, the most favourable time to make a speedy passage is from the end of February or 1st of March to the middle of September, when the S.W. monsoon predominates.

In February and March from Ceylon.

Ships bound from the Malabar coast, or southern part of Ceylon, to Bengal, late in February or in March, should work along the east side of that island to Aganis or the Friar's Hood, if the winds are moderate and the current not unfavourable; then proceed on a direct course, as the winds admit, for the coast of Orixa about the High Land of Pondy. After reaching the S.E. part of Ceylon, about the Basses, if strong N.E. winds and southerly currents be experienced, rendering any progress to the northward difficult, it may be prudent, to prevent loss of time, to stand off to the eastward close to the wind; and when 1° or 2° from the land, it *probably* will become variable at N.W., West, or S. Westward, or sometimes at S. Eastward, favourable for proceeding to the northward; but it is advisable not to stand far to the eastward into the middle of the bay, where the winds are generally from the northward in March, with a current often setting to the southward.

Passage from the Coromandel coast, and from Malacca Strait.

Departing from the Coromandel coast late in February or in March, it is prudent to keep at a considerable distance from the land, to benefit by variable winds, which may be sometimes expected from the southward: whereas, near the coast, Easterly or N. Easterly sea breezes and faint airs are frequently experienced, making it tedious to get to the northward.

When an offing is obtained, according as the wind will permit, a course should be followed to make the coast of Orixa about Pondy or Ganjam, where the land is high and bold; if a ship do not make it here, she ought certainly to endeavour to get a sight of the Jaggernaut or Black Pagodas.

Ships leaving Achen or Malacca Strait at the period last mentioned should proceed on either side of the Nicobar Islands into the bay, as may be most convenient with the prevailing winds, then steer for the coast of Orixa as directed.

Passage in the S.W. monsoon.

From the beginning of April to the middle of September the S.W. monsoon generally prevails along the western side of the bay; during this period, ships bound to Bengal from Ceylon or the Coromandel coast, ought to keep within a moderate distance of the land, as the wind sometimes inclines from the westward.

They should also observe, not to approach it very close until to the northward of Vizagapatam, by which will be avoided the curvatures and large bays, and the S. Easterly sea breezes that blow into them frequently with considerable strength. As the currents are liable to run strong to the N. Eastward when the S. Westerly wind is strong, it will be proper, when observations are not obtained, and the distance of the land not exactly known, to haul in for the coast, and make it in lat. $18\frac{1}{2}°$ or 19° N., then follow the directions already given for approaching the River Hoogly during the S.W. monsoon.

Ships bound to Bengal, from Achen or Malacca Strait, in the S.W. monsoon, might come out by the Surat Passage, or rather between Pulo Brasse and Pulo Rondo, whereby they will be enabled to pass to the southward of the Nicobar Islands, or they may keep close along the east side of these, and pass between them and the Little Andaman; or should a ship steer to the eastward of all the islands, and proceed through the Cocos Channel to the northward of the Great Andaman, she will *generally* be able to make the coast of Orixa about Point Palmiras, without tacking, unless the winds hang to S.W. and W.S.W., with a N. Easterly current, which sometimes happens in the strength of the monsoon; and this makes the passage to the westward of the islands preferable, when that route can be conveniently followed.

SHIPS leaving Ceylon or the Coromandel coast for Bengal, late in September, should stand well out from the land; if the S.W. winds are found steady, a direct course may be steered for Point Palmiras. If the monsoon appear to be expended, and the winds incline from the Northward or N. Eastward, every advantage ought to be taken to get over on the east side of the bay, by attending to the shifts of wind; and when within one or two degrees of the Andaman Islands or Cape Negrais, it will be prudent to make all the northing possible with the N. Easterly winds, and endeavour to fall in with the entrance of Sagor Channel. Departing from Madras or other southern ports on the Coromandel coast, in the early part of the N.E. monsoon, ships are liable, when the winds are light at times from eastward, to be drifted along that coast and the east side of Ceylon by strong southerly currents, before an offing can be obtained; here, they frequently meet with N.W. winds, favourable for running over in the eastern part of the bay.

*Passage towards Bengal in September.*

*Passage in the N.E. monsoon, from Ceylon or the Coromandel coast.*

In proceeding to the northward, it is advisable to work in the open sea, and not along the coast of Aracan, although in October and November that coast may be approached within any discretional distance,* being the windward shore; for in the *early* part of the N.E. monsoon the coast of Orixa should be avoided, because *then*, the current generally runs strong to the southward along that coast.

About the end of December the southerly current begins to abate on the coast of Orixa, after which many ships approaching the entrance of Hoogly River fall in with that coast about Point Palmiras or the False Point, and from thence soon reach the entrance of Sagor Channel, by standing out to sea into deep water, and afterwards to northward; but it is prudent, during the whole of the N.E. monsoon, to work up in the middle of the bay, or nearest to the eastern side, and endeavour by a direct route, when confident of the longitude, to strike soundings on the tail of Sagor Sand, or the Eastern Sea Reef, without approaching the coast of Orixa, or too near that of Aracan; agreeably to the directions already given for approaching the River Hoogly in the N.E. monsoon.

During the whole of this monsoon, ships bound from Achen or Malacca Strait, to Bengal, have the choice of proceeding by any route circumstances require; they may pass outside the Nicobar Islands, or through any of the channels between them and the Little Andaman, or that formed between the latter Island and Great Andaman; but it seems preferable for ships coming out of Malacca Strait, after taking a departure from the south end of Junkseylon, to steer for Narcondam Island, and pass through the channel betwixt the north end of the Great Andaman and Coco Islands, or between

*Passage from Malacca Strait.*

* Ships that sail indifferently upon a wind ought to keep farther to the eastward than others which sail well.

the latter and Preparis Island.* Having passed through either of these, they should steer to the northward close hauled for the entrance of Sagor Channel, making a direct course if the winds admit, or by tacking occasionally, without borrowing too near the coast of Aracan.

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## FROM BENGAL TO MADRAS, AND THE SOUTHERN PARTS OF THE GULF.

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To sail from Bengal to the Coromandel coast in September.

TO SAIL from Bengal to Madras and the southern parts of the bay, the best time to make a good passage is from the middle of October to the middle of February, when the N.E. monsoon predominates.

Ships leaving Bengal in September, bound to Madras, or any other part of the Coromandel coast, ought to keep near the western shore; the prevailing winds in this month will be found from S.S.W. to West, often light and baffling, with a drain of current to the northward at times. If after leaving the pilot, the wind keep well to the southward, a ship ought to stand for the western shore, and work along it to the S. Westward, keeping mostly in soundings, so long as her progress is considerable. Should that be very slow, it may be expedient to stand well out from the land, and take every advantage of the shifts of wind; for at times, when the current sets to the N. Eastward along the coast, there is none experienced in the offing: at other times, the current runs to the N. Eastward in this month, in the open sea, when there is none running on the coast of Orixa, so that the most speedy passage may at one time, in September, be experienced, by keeping along the coast; and at another time, by keeping well out from the land, in the same month.

It would, however, be very imprudent, for a ship bound to any part of the Coromandel coast in this month, to stand out into the middle of the bay, as the wind prevails at times from westward.

Passage in October and November, to that coast, or to Ceylon.

In October and November, ships should keep within a moderate distance of the coast, prepared for bad weather, which is then liable to happen; after the middle of October, they may experience N.E. winds for several days after leaving the pilot, but will *probably* meet with them variable when well to the southward, sometimes from S.W. in the offing, but close to the coast, generally from eastward.

To whatever part of the Coromandel coast a ship is bound, after the middle of October, she must get in with the land to the northward of that place, to prevent being carried past her port of destination by the strong currents, which prevail part of October, November, and December. If bound to Madras, it will be prudent to make the land about Pulicat, and take care not to pass that place until in soundings.

When bound to Trincomalee, or any place on the east side of Ceylon, in the same season, a ship must likewise endeavour to make the land to the northward of her port, or she will probably be carried round on the south side of that island by strong southerly currents; but the entrance of Palk Bay, between Point Calymere and the north end of Ceylon, ought not to be approached close, as the current sometimes runs through it to the westward, and with a N.E. gale it becomes a dangerous lee shore.

* The brig Daphne, Captain Hull, is said to have struck on a rock, which bears S. by W. 5 miles from the S.E. end of the Little Coco, although that vessel was drawing only about 10 feet water at the time.

In December, the same route as in the preceding month is proper; a moderate distance from the coast should be preserved, where the wind will usually be found more steady than close in with the shore. In this month also the current generally runs strong along the coast to the southward, rendering it necessary to make the land to the northward of the intended port. In December.

If the weather is clear, a ship bound to Madras may haul in for Armegon Hill in the day, which will be seen when 2 or 3 leagues outside the shoal, but not if the weather is hazy: in the night, it should not be approached, being steep to, having 28 or 30 fathoms within 3 or 4 miles of its outer edge.

A ship making the land about Pulicat, or a little to the northward of Madras, in these months, when a strong southerly current may be expected, ought to haul into 16 or 17 fathoms, but not to come under these depths if it is night, till past Pulicat Reef; she may then borrow into 11 or 12 fathoms. As Madras is approached, the light will soon be seen, to guide her into the road, if the weather be clear; otherwise she ought to anchor to the northward, or work to windward during the night, to prevent being driven to leeward. Ships having a cargo to discharge at any of the ports on the coast during the N.E. monsoon, ought to anchor a little to the northward of the landing place, or with it bearing about West, that the loaded boats may be enabled speedily to reach the shore.

Ships passing from Bengal to the coast, in January, should keep at a moderate distance from the land, out of the influence of light or variable winds, and when nearly in the latitude of the port to which they are bound, ought to steer for it. In January.

If the wind is found to blow strong from N. Eastward, it will be prudent to haul in for the land a little to the northward of the port; but if the month is far advanced, and the winds be light or variable, they should, after reaching its parallel, steer for it direct.

In February, ships leaving the pilot ought to keep well out from the Coast of Orixa, by steering to the southward; the light winds, and the land and sea breezes near the shore, will then be avoided, for in the middle and eastern parts of the bay in this month gentle N. Easterly winds usually prevail. In February.

After the beginning of this month, when they approach the Coromandel coast, S. Westerly breezes and a current running along it to the northward, *will probably* be experienced, making it advisable to keep well out in the open sea, until they are able to make the land a little to the southward of the port to which they are bound; or, if the wind continue steady from the northward or N.E. as they draw near it, a course should be steered for it, bearing about West; but they should not make the land to the northward of their port after the 1st of February.

During the whole of the N.E. monsoon, from September to March, ships bound to the east coast of Ceylon ought to fall in with it to the northward of their port; if bound to the opposite side of that island, or to the Malabar coast, they should endeavour to make the land about Aganis, or to the northward of the Basses; then coast round the south and S.W. sides of the island.

In March and April, ships departing from Bengal for the Coromandel coast or Ceylon will probably have the winds at first variable between S.S.W. and West, with which they ought to steer to the southward; if the wind be fair, a south course is the best, or S.S.E., as the winds admit; they will be found in March light and variable in the middle of the bay, mostly between West and N. Eastward, but near the western side, mostly from S. Westward. In March and April.

To benefit by light northerly winds in these months, ships ought to keep to the

eastward of the meridian of Point Palmiras, until they are well down the bay, taking care not to approach the Great Andaman Island, particularly if it is late in April; for then a gale from the westward is liable to happen, which would make it a dangerous lee shore.

After having taken every advantage of the shifts of wind by tacking when necessary, it will be prudent that they proceed about 20 leagues or more to the southward of the intended port before they haul across the bay towards it, making due allowance for a strong current running to the northward, with southerly winds, which will be experienced as they draw near the land.

If it is late in March or early in April, when ships leave Bengal River, light S.W. and S.S.W. winds may be expected to predominate throughout the middle and western parts of the bay; but to the eastward of the Andaman Islands, they are generally from N. Westward at the same time; on this account some ships bound to Europe, or by the southern passage to Bombay, proceed to the eastward of these islands, and on either side the Nicobar Islands, as seems most eligible; but when the winds permit, the route to the westward of all the islands is preferable, taking care to avoid the bank with $4\frac{1}{2}$ fathoms on it, about 9 or 10 leagues to the westward of the Great Andaman. Ships ought, on that account, to work or pass down the bay well to the westward of these islands, particularly late in April.

Ships bound to the east coast of Ceylon in March and April ought to keep well to the eastward in passing down the bay, agreeably to the directions given for proceeding to the Coromandel coast; having reached lat. 10° N., and nearly on the meridian of Point Palmiras, or that of the sea reefs, a course should be steered for the land to the southward of their port, as the currents set strong to the northward at times along the east side of Ceylon in these months. If bound to the west side of that island, or to the Malabar coast, they should, from lat. 9° or 10° N., steer for the southern part of Ceylon, and endeavour not to fall in with it to the northward of the Great Basses.

To pass round Ceylon.

Ships bound to the Malabar coast in these months ought not to keep near the island after reaching Point de Galle, for brisk S.W. winds often blowing into the Gulf of Manar make it then advisable to stretch out from the land, and get well to the westward, that they may be enabled to round Cape Comorin without loss of time.

Passage to Malacca Strait in the N.E. monsoon.

DURING THE NORTH-EAST MONSOON, from September to May, ships bound from Bengal to Achen or Malacca Strait should steer to the S. Eastward, and pass between Cape Negrais and Preparis Island, or betwixt the latter and Coco Islands: from thence a direct course may be adopted to Pulo Way, if bound to Achen; or to Pulo Bouton, if bound through Malacca Strait, or to Prince of Wales Island. The currents on the east side of the bay, and about the Andaman Islands, in March, generally set to S.W. and southward, making it advisable to keep well to the eastward, if it be intended to pass through any of the channels to the northward of these islands.

If a ship fall to leeward, she ought to steer to the westward of the Great Andaman, and pass between it and the Little Andaman, if the wind and currents admit; otherwise she must work to the eastward betwixt the latter and the Island Carnicobar, which will considerably protract her passage; it is therefore prudent to keep well to the eastward after leaving the pilot, and proceed to the northward of the Island Preparis. The currents between these islands and Junkseylon are very variable in the N.E. monsoon; in the early part of it they mostly set to the N. Westward, but at the close, in March and April, generally to the S.W. and southward.

IN THE SOUTH-WEST MONSOON, ships leaving Bengal, whether bound to the Coromandel coast, to Ceylon, to any place West of Malacca Strait, or by the southern passage to Bombay, or the Persian Gulf, must endeavour to keep well to the westward in passing down the bay, and avoid the Andaman Islands, where the squalls are often sudden and severe, with dark cloudy weather, rendering it almost impossible to get to the southward, when ships fall in with them in this season.* Passage down the Gulf in the S. W. monsoon.

Ships departing from the River Hoogly from April to September, to prevent getting over to the eastward, ought soon after quitting the pilot to tack, when the wind will admit the western shore to be approached about the False Point. They will find the winds veer frequently towards the land in the night, favourable for standing to the southward, and in the day, generally blowing along shore, or inclining a little from the sea. With these winds they ought to work to the southward along the coast, endeavouring to be well in with the shore when the land breezes may be expected, between midnight and 2 or 3 o'clock in the morning. In June and July these land winds often prevail, when a passage may at times be made from leaving the pilot to Madras in 10 or 12 days; at other times they do not happen, when the along shore winds are prevailing; but as this is the windward coast, where the sea is more smooth, and the weather more favourable than in the middle and eastern side of the bay,† ships *should resolve* to keep near it, so long as they make considerable progress to the southward. If on the coast of Orixa the current is found to run to the northward, without any favourable breezes from the land, rendering it difficult to gain much ground, a stretch to the S.E. may be made about 23 or 25 leagues from the land, where *probably* there will be less contrary current than in soundings; but it would be imprudent to stand far over into the bay in search of better winds.

By keeping near the coast, or within a moderate distance, making a stretch close in at times when the land breezes are expected in the night, these favourable breezes will become more certain as the distance is increased to the southward; having got as far as Point Gordeware, it will not be necessary to approach the shores of the deep bays situated between that point and Pulicat, but a stretch may be made from the point to the southward until past them, then work in towards the coast about Armegon, or between it and Pulicat. The land breezes will now become more regular, with sea breezes from S. Eastward in the day, enabling ships to proceed along the coast with facility.

Ships bound to Trincomalee must continue to work along the coast of Coromandel to Negapatam, before they stretch across the entrance of Palk Bay for the island of Ceylon. Passage to Ceylon.

Ships departing from Bengal, bound to Achen or Malacca Strait in the S.W. monsoon, ought to proceed nearly by the same route as in the opposite season. After leaving the pilot they should stand to the S.S. Eastward as the winds admit, until to the southward of lat. 15° N.; if then certain of their situation, a direct course may be steered for the Coco Islands, or rather for Landfall Island off the north end of the Great Andaman. Passage to Malacca Strait.

* Bound from Bengal to Bombay by the southern passage, in the King George, we left the pilot 29th May, 1791, and made the Centinel and west side of the Andamans, 7th June, having experienced about 1 degree of easterly current from leaving False Point, seen on the 20th May: severe squalls and very unsettled weather close to these islands made it impossible to weather them; carried away the fore-yard 10th June, was forced to run to the northward round the north end of the Great Andaman, and proceeded to Prince of Wales Island to replace the fore-yard. Here was found another ship bound to Bombay, that left the pilot before us, getting repairs, having disabled a lower mast, and sustained other damage, on the west side of the Andaman Islands.

† Many ships, deeply laden with rice, after leaving the River Hoogly in June, and some in July and August, have encountered storms, with a heavy turbulent sea, and foundered with their crews in the N.E. part of the bay.

If not confident of their situation, it will be prudent to get into lat. 14° N., previous to edging away for the channel betwixt Landfall Island and the Cocos, which ought to be chosen, because it is farther to windward than that between the latter islands and Preparis; and the winds frequently inclining to S.W. or S.S.W. in the early part of the S.W. monsoon, render it advisable not to fall to leeward.

Having passed between the Coco Islands and Landfall Island, they should keep nearly close to the wind, in proceeding to the southward, to avoid the Archipelago of Islands off the coast of Tanasserim, which should not be approached in the S.W. monsoon. Neither should the east side of the Andaman Islands be borrowed on too close, in case of getting near the Invisible Bank, which is very dangerous to approach in thick weather, or in the night. To prevent either of these extremes, a course may be steered from the Coco Islands direct for Barren Island; and from the latter, after passing it on either side as most convenient, ships may keep nearly close to the wind if bound to Achen, giving the Invisible Bank and Nicobar Islands a proper berth. If bound to Prince of Wales Island or Malacca Strait, it will not be requisite to keep so close to the wind; nevertheless, it is prudent to steer well to the southward, to give a sufficient berth to the Seyer Islands and S.W. end of Junkseylon in passing, in case S. Westerly winds should prevail off that headland, which is not always the case in the S.W. monsoon. When round Junkseylon, a direct course ought to be steered for Pulo Bouton, and from thence to Prince of Wales Island.

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## FROM THE GULF OF BENGAL TO BOMBAY, OR OTHER PLACES TO THE WESTWARD, DURING THE SOUTH-WEST MONSOON.

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Passage to the western parts of India, or to Europe in the S.W. monsoon.

THE DIRECTIONS given in the last section will answer equally for ships proceeding from Bengal to the Coromandel coast, or to the western parts of India, during their passage down the bay. In the former case, it is indispensable that ships bound to the coast, or to Ceylon, do keep near the land on the west side of the bay, during the strength of the S.W. monsoon.

The same route is advisable for ships proceeding to the western parts of India, or to Europe, although it is not so particularly requisite that these continue to keep close to the land.

If, after leaving the pilot, the wind keep well to the westward, a long stretch down the bay may be made; when it veers to S.W. and S.S.W. they should tack, and stand in for the western shore, taking particular care not to get over to the eastward near the Andamans. If they get fast to the southward by keeping near the coast, it will be prudent to continue to do so: if, on the contrary, the progress is slow, they ought to stand close hauled to the southward, and by tacking with the favourable shifts of wind, embrace every advantage to make southing in the middle of the bay. When with the prevailing winds, they can pass 30 or 40 leagues to the westward of the Little Andaman, they ought to continue to stand to the southward; for in such cases they will, *probably*, be also able to pass to the westward of the Nicobar Islands and Achen Head, without tacking.

Ships coming down the bay far to the eastward will usually find it tedious getting to

the southward, in the space between lat. 3° or 4° N. and the S.E. trade wind; which is occasioned by light variable winds and squalls, mostly from S. and S. Westward in the vicinity of the islands near the west coast of Sumatra; whereas ships that stretch to the southward, from the east part of Ceylon, experience few light winds in passing from the S.W. monsoon to the S.E. trade.

SHIPS FROM MALACCA STRAIT, bound to Europe, or to Bombay by the southern passage in the S.W. monsoon, ought to keep along the north coast of Sumatra from Diamond Point to Achen, where the current will soon carry them to the westward, although calms and faint airs may be experienced. Passage out of Malacca Strait.

From Achen they should either proceed out by the Surat Passage if the weather be very favourable, or should work close round the north end of Pulo Brasse, where the current frequently runs to the westward among these islands, when at the same time it is running strong to the N. Eastward betwixt Pulo Rondo and the Nicobar Islands. Ships, therefore, ought not to attempt to work out in the Great Channel, but should proceed through the Bengal Passage, betwixt Pulo Way and Pulo Brasse. Having got fairly out to the westward of Achen Head, every advantage must be taken to get to the southward into the S.E. trade, and to keep well out from the islands adjacent to the west coast of Sumatra, by tacking with every favourable change of wind.

SHIPS leaving MADRAS in the S.W. monsoon, bound to Europe, or to the western parts of India by the southern passage, may, when the land and sea breezes are prevailing, coast along to Pondicherry before they leave the land; but in the early part of the monsoon, when the winds blow mostly along shore, with a strong current running to the northward in soundings near the coast, it is tedious and difficult to work along it to the southward. At such times, to prevent delay, it seems advisable to stretch off from Madras close hauled, with the along shore winds, for they will generally be found to veer more to the westward in the offing, particularly as the distance to the southward is increased. With these winds ships ought to stand to the S.S. Eastward, and as the equator is approached, the S.W. monsoon will decline, and the winds will draw more southerly; it will then be proper to stand close hauled to the S. Eastward, or on the tack on which most southing can be made. From Madras to the southward.

After getting the S.E. trade, ships bound to Europe generally steer a direct course to pass well to the southward of the Island Roderigue, and the south end of Madagascar; but those destined for the Red Sea, the Persian Gulf, or Bombay, have the choice of proceeding by two different routes to the westward; for which, brief directions have been given in a former section of this work,* and some farther instructions in this place probably will be of utility. Passage towards Europe.

It may be observed as a *general rule*, that the farther the island of Sumatra is distant, the nearer the S.E. trade winds approach the equator; and in June, July, and August, when they blow nearest to it, may be expected in from lat. 2° to 4° S.

The northern, or short route, should never be adopted except late in June, all July, and early in August, when the northern limit of the S.E. trade approaches nearest the equator. If a ship during this period cross it well to the westward, and having got into lat. 4½° S. find a steady S.E. trade wind, she may run down her westing near that parallel, keeping between it and lat. 5° S. When she gets into lon. 73½° or 74° E., it will be proper to avoid the north end of Speaker's Bank, by not exceeding lat. 4° 30′ S. Passage towards the western parts of India, by the northern route.

* See chapter on "Passages to and from the Red Sea," p. 376.

whilst passing it; and she ought to keep nearly in the same latitude afterwards, until sufficient westing is obtained.

Passage by the southern route.

The southern route is more certain at all times than that last mentioned, and it is only because *there*, in June, July, and August, the weather is often cloudy with rain, depriving the navigator of regular observations, that some prefer the northern route in these months.

When ships cross the equator far to the eastward, or depart from Sumatra or Java, the southern route ought to be followed; and should be adopted always in May, part of June, August, and the early part of September, by ships making the southern passage to Bombay, or other places to the westward.

A ship proceeding by this route should get into lat. 9° to 10° S. as speedily as possible, where a steady and strong trade will generally be found to run down the westing. If not certain of her longitude by observation or chronometer, it will be advisable to steer for the Island Diego Garcia to correct the reckoning, and where water may be obtained if wanted; otherwise, she ought to continue in lat. 8° or 9° S. until 40 or 45 leagues to the westward of that island. If Diego Garcia is seen, it may be advisable to make a course from its south end, either W. $\frac{1}{4}$ S. or W. by S., to give a berth to the Centurion Bank, and to Owen Bank, the former bearing from it W. 7° S., distant 33 leagues, having never been explored, but is *probably* not dangerous. Owen Bank lies to the N.W. of Centurion Bank, and they have been described under the Section, "Chagos-Archipelago."

To whatever place a ship is bound, sufficient westing should be made to the southward of the equator, to enable her to make a fair wind of the S.W. monsoon, which frequently hangs far to the westward and blows strong, producing a current to the eastward.*

Passage towards the Red Sea.

Being between 2° and 3° to the westward of Diego Garcia, or in lon. 70° E., a ship may begin to steer a little to the northward of West. If bound to the Red Sea, she ought to pass near the northernmost of the Seychelle Islands, or make the Island Denis, to correct the longitude, if the weather admit, and from thence steer a course to cross the equator in about lon. 49° or 50° E. By crossing it well to the westward, she will find the S.W. monsoon favourable in proceeding for Ras Jar d'Afoon, and particular care is requisite to fall in with the coast of Africa to the southward of that headland; should she be carried past it by the current, the difficulty of getting in with the land in opposition to a strong southerly monsoon and lee current would be found *probably* insurmountable in an indifferent sailing ship.

From Ras Jar d'Afoon, she must work along the coast of Africa to Burnt Island, or farther, against westerly winds prevailing in this season, before she stretch over for the land of Cape Aden, or rather the coast about Cape Arimora, if the wind admit.

Passage towards the Persian Gulf,

A ship bound to the Gulf of Persia ought to cross the equator in about lon. 54° or 55° E., and follow the directions given for sailing to that gulf in a former section of this work.

or Bombay.

Having made $2\frac{1}{2}$° or 3° westing from Diego Garcia, a ship bound to Bombay should steer to the N. Westward, and cross the equator in about lon. 64° or 65° E.; if the

* Several ships, when navigated by dead reckoning, have fallen in with the Maldiva or Laccadiva Islands, and were obliged to stand back into S. lat. to run down more westing. The St. George, bound from Bengal to Bombay by the southern passage, got into the Gulf of Manar in June, 1791, when they reckoned themselves 7° or 8° to the westward of Cape Comorin, by which they lost their passage, already mentioned in the description of the Gulf of Manar.

longitude is not correctly known by observation, she ought to have $3\frac{1}{2}°$ West variation on the equator, which will, *if the compass is right*, place her in the longitude mentioned; to the eastward of which it would be imprudent to cross the equator in the strength of the S.W. monsoon, more particularly in a ship that sails indifferently with a strong wind and a high sea upon her beam; which are liable to prevail from W.S.W. and Westward during this season, between the equator and the coasts of Arabia and Hindoostan.

In steering to the northward, a ship ought to keep far to the westward of the Laccadiva Islands, and not approach the coast until she get into the latitude of Cundaree Island, at the entrance of Bombay Harbour, at least 20 or 30 leagues to the westward of that place; she may then follow the directions already given for approaching Bombay Harbour in the S.W. monsoon.

## PASSAGE BETWEEN BENGAL OR MADRAS AND THE STRAIT OF MALACCA.*

SHIPS LEAVING BENGAL in the N.E. monsoon, bound to the Strait of Malacca, should, at leaving the pilot, keep their wind, to weather the island of Preparis, or pass close to the westward of it, when they will have a fair wind all the way down. They will experience a current to the westward, crossing from the sand-heads to Cape Negrais, of perhaps 90 to 100 miles. Ships should haul close round Junkseylon and the Brothers, and if they can go within Pulo Bouton they ought to do so, as there is a strong off-set or current to the westward all along the bay.

Ships leaving Bengal, bound for the Strait in the S.W. monsoon, should, on leaving the pilot, keep the wind free, and pass between the Great Andaman and the Coco Islands, or to the eastward of the Cocos, if they cannot be weathered with ease; but be careful of coming near the Preparis in this monsoon, as there is a shoal lies out to the W.S.W. of the South end of the island 3 or 4 leagues.† After passing these islands they should keep the wind a little free, and steer for the Seyer Islands, then pass to the eastward or westward of Pulo Bouton as may seem proper.

Departing from Madras for Malacca Strait in the S.W. monsoon, I would advise making a fair wind, and steer to go through the Ten Degrees Channel in place of sailing close by the wind for Achen.

Leaving Madras for the Strait in the early part of the N.E. monsoon, it *may be* best to fetch where you can to the southward of Achen Head, then work through the Surat, or Bengal Passage, and afterwards along shore to Diamond Point, from whence you can cross over to Penang.

* By Mr. James Carnegy, merchant at Prince of Wales Island, who was formerly an experienced commander in the country trade.

† The brig Athena, Captain Daniel, bound from Rangoon to Bengal, was wrecked on the outer sandy islet of this roof in the night, 26th July, 1815, which he states to be about 12 miles distant from Preparis Island. Captain Balston, of the ship James Drummond, who took Captain Daniel and part of his people from the islet on the 13th of August, the rest having previously quitted it on a raft, describes the reef as "extending to the southward about 20 miles, in detached patches—many parts dry at low water." This estimated distance is too great, although it is certain this dangerous reef extends a great way out to the S. Westward of Preparis Island, and ought to have a wide berth in passing.

In the latter part of the monsoon, or after the 15th February, when the southerly winds have set in, it may be best to proceed along shore a considerable way to the northward, then stand off, to pass through one of the channels between the Great Andaman and Cape Negrais, or between the Great and Little Andaman.

The James Sibbald, Capt. J. K. Forbes, in 1826, remained in Madras Road from November 25th till December 21st, preparing an orlop deck for the reception of troops, and had often unsettled rainy weather. She sailed on the 21st December for Penang, with troops, had the N.E. monsoon usually between N.E. and E. by N., with which she beat across the bay, and never went to the southward of lat. 7° 40′ N., nor to the northward of lat. 13° 18′ N. January 7th, 1827, she saw the Great Centinel, passed near to the Little Centinel, then through the channel to the South of the Little Andaman on the 8th, passed Barren Island on the 12th, and observed the volcano on the north side of the island to be in an igneous state. Passed Junkseylon on the 19th, and on 25th arrived at Penang.

Ships leaving the Strait of Malacca for Bengal in the N.E. monsoon should go to the eastward of the Andamans, if the wind be favourable; but they ought not to lose any time tacking about, as the farther they are off the eastern, or western shore, the more the wind will draw to the eastward; so, rather than lose time, they should pass through the Ten Degrees Channel, and after reaching lat. 18° to 19° N., if not far enough to the eastward, they can make a stretch that way for a day, or more if necessary. The pilots in this monsoon are found between the Eastern Sea Reef and Sagor Sand, in lat. 21° 5′ N. In the S.W. monsoon, they are found in 12 to 15 fathoms water, between Point Palmiras and the Western Sea Reef.

Ships leaving the strait, and bound to Bengal or Madras in the S.W. monsoon, or if bound across the equator, should keep close along the Pedir Coast, where a current to the westward will always be found in their favour, and a land wind at night. They should go through Achen Road, and if blowing weather prevail, anchor for a few days until it moderate, then push through the Bengal Passage, and they will weather the Nicobar Islands with ease; from hence, ships bound to Calcutta will have a fair wind. If bound to Madras, they may probably, if the wind hang far to the westward, be obliged to tack now and then to get to the N. Eastward, but on no account cross the equator, to get westing; sooner make the Coromandel coast, and beat down along shore. Ships bound across the equator to Europe, or other western ports, on leaving the Bengal or Surat Passage, ought to carry a press of sail to get westing.

In the S.W. monsoon, a fast-sailing ship bound to Calcutta may always with safety go *also* up within the Andaman Islands, and pass the Coco Islands either to the eastward or westward; but it is preferable to pass to the westward, being in such case more to windward, and from hence, she will with ease fetch Point Palmiras, or even the False Point, if required.

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Places in this Index marked with * have their Latitudes and Longitudes given; those marked with † have their Latitude only given.
*Abbreviations.* B. Bay—C. Coast—Ca. Cape—G. Gulf—H. Harbour—I. Island—Is. Islands—P. Port—Pt. Point—R. River—Sh. Shoal—N. North—S. South—E. East—W. West.



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END OF VOLUME I.

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SUPPLEMENT TO THE FIFTH EDITION

OF

# HORSBURGH'S EAST-INDIA DIRECTORY.

VOLUME I.

THE following abstracts contain the information which has been received since the publication of the fifth edition of the Directory; and in order to ensure an early circulation of all such new matter, it is intended to issue from time to time similar abstracts in continuation.

# SUPPLEMENT.

TENERIFE. (Vol. i. p. 11.)—Mr. Bartlett, the British Consul, gives the following directions for Santa Cruz:—

"When running for the anchorage, keep the lead briskly going, and bring up to the northward of the Mole Head; or bring the clock front of the square church tower with a cupola bearing W.N.W., and anchor with this mark on or to the northward of it. Ships may anchor in less than 30 fathoms, and should give a large scope of chain cable. When the northernmost fort (Paso Alto) bears N.N.E. the depth of water will be about 25 fathoms on the lines pointed out. The shore may be neared without risk, the water being deep, and there being no dangers that are not apparent. The anchorage to the southward of the lines indicated is reserved for vessels in quarantine. Var. 22° 41′ W.—(*N. Mag.* 1843, *p.* 217.)

ASCENSION ISLAND. (Vol. i. p. 35.)—Capt. Dundas, of H.M.S. Melville, in Nov. 1839, fell in with a large Dutch merchant ship, which had struck and unshipped her rudder on the rocky shoal extending from the north point of this island, the master of which ship reported, that the rocks extended more than three-quarters of a mile off shore; but this is very doubtful as he gave no accurate bearings. This ship sunk a few hours afterwards off Pyramid Point, and the following are the marks for the wreck. Goat Hill in a line with the crane on the jetty; Cross Hill Flag Staff shut in a sail's breadth with the black point of rocks at the east end of the white sandy beach; Pyramid on Pyramid Point, in one with two small remarkable rocks on the shore above it to the S.E.

SEYCHELLE ARCHIPELAGO. (Vol. i. p. 189.)—H.M.S. Sulphur visited Mahé in Feb. 1842, and in the published account of her voyage it is said (Vol. ii. p. 276), "that owing to the transparency of the water all absolute dangers are visible, and the port or inner harbour may be safely resorted to, where vessels intending to remain any time, will find the water smoother and without that swell which renders the anchorage unpleasant." It is also recommended that any vessel anchoring near St. Anne Island should run out her stream anchor astern, in the direction of the swell, to prevent the heavy rolling which must result from her being brought broadside to the swell by any sudden flaw of wind off shore during the night.

ALGOA BAY. (Vol. i. p. 244.)—Two Beacons have been erected on the shore to the southward of Rocky Point, as marks for avoiding the *Dispatch Rock*. They are black wooden beacons, standing upon foundations of whitewashed masonry. The inland beacon has a cross like the arms of a windmill, and when in one they bear due West by compass. To avoid the rock, a ship must be careful not to bring the beacons in a line until the flag-staff at the whale fishery buildings is seen open to the north eastward of the outermost of the detached rocks above water, extending from Rocky Point, and bearing about N.W. by W. ½ W. Another good mark in clear weather, is a remarkable, high, and distant hill N.W. of the town, kept open to the north-eastward of all the buildings of the town, which mark will lead clear to the eastward of the rock in 15 or 16 fathoms.

REDWING ROCK.—Captain Dundas of H.M.S. Melville, when in Algoa Bay in 1839, was informed that this rock did not exist, but that patches of soundings, with not more than 4 fathoms water on them, are to be met with in many parts of the bay at the distance of a mile from the shore.

BOMBAY HARBOUR. (Vol. i. p. 456.)—The following notice respecting the new floating light has recently been published at the East-India House:—

NOTICE TO MARINERS.

Notice is hereby given, that a Floating Light is stationed in the Fair Channel into Bombay Harbour about ¾ of a mile to the S.W. by S. from the Fair Way Buoy, in about 9 fathoms at high water, and 7 fathoms at low spring tides, with the following bearings and distances.

Flag Staff on Malabar Point, N. 5° 46′ E. distant 6·90 nautic miles.

The Light House on Colaba, N. 21° 34′ E. distant 4·56 nautic miles.

The Fair Way Buoy, N.E. by N. distant ¾ of a mile.

The Floating Light at the Sunken Rock, N. 38° 50′ E. distant 4·68 miles.

Kennery Island, S. 14° 15′ E. distant 7·43 miles.

The Point of the S.W. Prong, in 6 fathoms foul ground, bears North about two miles.

The Middle of Thull Shoal, E.S.E. 2 miles.

When approaching the harbour, if the Floating Light Vessel is seen bearing upon any point from N. by E. round to the Eastward as far as S.E. by S., a ship might steer directly for it, and when up with the Light Vessel should steer from her N.E. Easterly, so as to pass about ¾ of a mile to the Eastward of the other Light Vessel, which is moored about a quarter of a mile to the Southward of the Sunken Rock. After rounding the Rock Light Vessel, you may steer more Northerly, and if it be at night, should anchor about 1 mile to the N.E. by N. from it, where the water will be smooth. The South point of the Middle Ground Shoal bears N.N.E. distant 2 miles from the Rock Light Vessel.

Both Light Vessels are painted Red, each carrying a ball on the Light Mast, and during daylight they hoist a Red Flag when a sail is in sight.

The Outer Floating Light burns a Blue Light at the end of each hour during the night, and displays a torch at the half-hours.

The Flood Tide comes in from S.W., and Ebb from the N.E. It is High Water at 12 hours on full and change of the moon.

East-India House, JAMES C. MELVILL,
London, 15th February, 1843. Secretary.

*Note.*—The Floating Light was tried during the last Monsoon, and rode well, but in the event of her breaking adrift, the Fair Way Buoy is continued at its station.

BENGAL BAY.—The following notice of a Shoal was published at Fort William on the 20th Dec. 1842.

*Extract from the Log of the barque "Planet."*

"Wednesday, 7th Sept. 1842.—At 1 P.M. observed the water on the starboard bow much discoloured; kept the ship away, and sent a hand aloft to look out, who observed the same in patches as far as the eye could reach, running about W.S.W. and E.N.E.; passed over the tail of one patch, and had, as near as we could suppose, 9 fathoms on a sandy bottom, a quantity of sand fast to the lead when hauled in. The extent of the shoal appeared to be about three miles. Lat. 16° 23′ N., lon. 84° 10′ E. Captain Thompson further states, that in the centre of this shoal there were heavy breakers; the weather had been squally in the forenoon, but was then more moderate, though the breeze was fresh and a swell in consequence. They had no meridian observations, but the longitude was determined and laid down by good sights taken that morning, and an excellent chronometer."

(True Extract.) (Signed) C. B. GREENLAW, *Secretary.*

HOOGHLY RIVER. (Vol. i. p. 613.)—The following is a copy of the notice respecting the Pilot Station, which was published at the East-India House in January last.

NOTICE TO MARINERS.

PILOT STATION OFF THE MOUTH OF THE RIVER HOOGHLY.—Notice is hereby given, that the same causes existing, which, during the last S.W. Monsoon, rendered necessary the removal of the Pilot Station from off

Point Palmyras to a position of 6 or 8 miles S.W. of the Outer Floating Light, and in from 16 to 20 fathoms water, this latter station will be continued during the next S.W. Monsoon, *viz.* from 15th March to the 15th September.

During the last S.W. Monsoon no difficulty would appear to have been experienced by Vessels passing from False Point Light-house to the New Station, nor can any be felt if common attention be paid to the Lead, and to the following directions prepared by Captain Lloyd, late Officiating Marine Surveyor General, after a careful Survey of the ground between the two Points.

"False Point Light-house is in lat. 20° 19½′ N., and lon. 86° 47′ E., and that of the South Channel Buoy in lat. 20° 59′ N., and lon. 88° 4′ E., and bears from the former N. 61° E. true, or N.E. by E. ¼ E. by compass, distant 83 miles, and is laid in 12 fathoms.

"A Bank of soundings extends from off Point Palmyras in a direction towards the tail of the Western Sea Reef, and the nature of the bottom (as distinguished from that of the Hooghly deposit, which is sand and mud with shining specks) is a gravelly substance composed of sand, shells, and small pebbles discharged from the 'Kunka,' and other rivers near Point Palmyras, the lighter material of which being carried further out, is deposited, and forms what is called the Pilot's Ridge, which, in crossing to the N.W., shews a little less water than on either side; coming from seaward you shoal rather suddenly, from 28 to 23 fathoms upon its Eastern edge. It is composed of a shelly sand, or minute gravel, of a reddish or rusty-brown colour.

"The best guide therefore to enable a vessel to direct her course from False Point to the vessels at the New Station will be to run down the edge of the Pilot's Ridge, which can readily be done by making the Light-house, and bringing it to bear about W.S.W., or S.W. by W., distant by computation from 10 to 15 miles, then steering to the E.N.E., and having gradually increased the depth of water to 23 fathoms upon the Eastern edge of the Ridge, regulated the course to keep between it and 27 fathoms, when by attention to the lead, and nature of the soundings, course and distance run from the Light-house, it is almost impossible to miss the Pilot Vessels (if the above limits are kept within) either by getting too far to windward or falling to leeward; for the soundings increase so rapidly to seaward from the proposed New Station, that 28 fathoms will not be more than 3 or 4 miles to the Southward of it, and 23 fathoms the same distance to the Westward of it.

"The soundings to seaward of the Ridge are in general a greenish or olive-coloured mud, with occasionally a few bits of broken shells mixed with it."

Vessels approaching the Station during the day, are required to shew the usual signal for a Pilot, and by night, to give as early and as much warning as possible, by firing Guns, burning Blue Lights, and by exhibiting Two Lights in a vertical position, where best seen; but Commanders are recommended to avoid, as much as possible, making the Station during the night.

To mark the Station, one of the Pilot vessels will shew, during the day, a large *St. George's Jack* (White with Red Cross), at the Main Top Gallant Mast-head, and a good Mast-head Light during the night, and will burn a Blue Light and a Maroon alternately every half-hour, and fire a Gun at 8 P.M., at Midnight, and at 4 A.M. Vessels approaching the Station and while there, as well as when approaching the Light * and Buoy Station vessels, are warned to be careful in avoiding collision by night or by day, and in communicating with either of the above vessels, either at anchor, or hove to, when it is necessary to cross her to pass under the stern; several instances of serious damage having occurred during the S.W. Monsoon, whereby the Outer Floating Light was more than once compelled to leave her station for repairs, to the great inconvenience and risk of vessels entering and quitting the river.

A vessel will be stationed off False Point Light-house, keeping it, according to circumstances, W. by S. to N.W. by N. in from 10 to 15 fathoms water.

She will exhibit, during the day, when vessels are in sight, a large *Danish Jack* at the Main Top Gallant Mast-head (Red with a White Cross), and during the night a good Mast-head Light in the same place, and will burn a Blue Light every half-hour.

This vessel will have no Pilots on board, and is only intended generally to furnish information touching the course to the New Station, but particularly to do so to vessels which may be in ignorance of the position of the New Station.

East-India House,
London, 18th January, 1843.

JAMES C. MELVILL,
Secretary.

* The Light Vessels are directed, when another vessel is approaching during the night, to shew a Light at the Gaff-end to mark the way they are riding.

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PORTO PRAYA, CAPE DE VERDES. (Vol. i. p. 20.)—The inconvenience hitherto experienced by ships in procuring water here has been removed, the water having been recently conducted to the beach, so that it can be filled with great facility and in a good state. H.M.S. Vindictive, in April, 1842, obtained 60 tons in 48 hours. Merchant vessels are supplied by the boatmen, who bring the water off in rafts, charging 3*d.* for a large cask.—(*N. Mag.* 1843, *p.* 243.)

ALGOA BAY. (Vol. i. p. 244.)—A beacon has been placed on the *Dispatch*, or *Roman Rock:* it is a *black* spar, with a *red* board across the top, on which the words ROMAN ROCK are painted. It is moored about 40 fathoms inside the rock, leaving a safe passage between the beacon and the shore. Any vessel passing outside, to the eastward of the beacon, should not approach it nearer than three-quarters of a mile. —(*N. Mag.* 1843, *p.* 698.)

AFRICA, EAST COAST.—A SHOAL has been reported by H.M.S. Lily, in lat. 18° 35′ S., lon. 36° 40′ E., with $6\frac{1}{2}$ to 18 fathoms on it; the land near Quillimane in sight from the mast-head, supposed about 16 miles distant.

MADRAS. (Vol. i. p. 593.)—

NOTICE TO MARINERS.

Notice is hereby given, that on and after the 1st day of January, 1844, a Light will be exhibited on the New Light House erected at Madras, immediately to the Northward of the Walls of Fort St. George; and that on and after the said 1st day of January, 1844, the Light heretofore and now exhibited on the Old Light House within the walls of Fort St. George will be discontinued.

The New Light will be elevated 128 feet above the mean level of the Sea,—and may be seen from the Deck of a Ship at the distance of 20 miles. The Light is of the "Flashing Description," and the duration of the Flashes to that of the Eclipses or Dark periods is in the ratio of 2 to 3,—but as the nature of the motion is Reciprocating instead of Rotatory, the above ratio merely expresses the average proportion of the Light and Dark intervals, which are themselves variable according to the position of the Spectator. The rapidity of the movement is so adjusted, that the duration of the Flashes will vary from 0″ to 48″, and that of the Eclipses from 0″ to 72″, the sums of the duration of Light and Darkness bearing, however, in every position, the constant ratio of 2 to 3.

From the South-Eastern extremity of the Pulicat Shoal the New Light House bears S. 23° W., and is distant 13 miles; but no Ship or Vessel when hauling in from the Northward for the Madras Roadstead should bring the Light to bear to the Southward of S. 28° W., or S.S.W. $\frac{1}{2}$ W.,—unless her position is well ascertained. Commanders of Vessels are hereby warned of the serious risk they incur by incautiously approaching the dangerous vicinity of the Pulicat Shoal, as hazy weather or other causes may obscure the Light,—true Soundings, therefore, and a vigilant look-out, are imperatively called for.

The limits of the Madras Roadstead (in 8 or 9 fathoms) are comprised within the following bearings, viz. from the Northward the Light House will bear S. 56° W., and from the Southward N. 81° W., or from S.W. b. W. to W. $\frac{3}{4}$ N.

The New Light House
At Madras is in Latitude 13° 5′ 10″ North.
And in - - Longitude 80° 20′ East of Greenwich.

East-India House,
London, the 13th December, 1843.

JAMES C. MELVILL,
Secretary.

RIVER HOOGHLY, PILOT STATION. (Vol. i. p. 265, and Supplement to Vol. i. p. 3.)—The experience of two seasons having proved that the new pilot station can easily be made by vessels from False Point, and that pilots can also be readily supplied, it has been established by public notice, dated from the East-India House, 20th Feb. 1844, that the Pilot Station, about 15 miles S.W. by W. of the Outer Floating

Light, in lat. 20° 56′ N., long. 88° 3′ E., and in from 17 to 22 fathoms, will in future be continued during the South-west Monsoon, viz. from 15th March to the 15th September.

The Notice recently published does not mention the vessel stationed off False Point Lighthouse for the purpose of giving general information to ships respecting the course to the new station, and it is therefore concluded that she is no longer thought necessary. Directions, however, similar to those at page 4 of the Supplement, are given for passing from False Point to the new station.

LITTLE FISH BAY.—A dangerous shoal exists about a mile from the southern side, on which a Portuguese man-of-war was wrecked in 1842. To clear it, in standing in for the anchorage, keep the fort open of the points of land on the south side. Good water may be procured here from the river, but it is nearly 3 miles distant from the anchorage, which is in a little bay opposite the Portuguese settlement. Beef and vegetables may also be had.

ST. HELENA BAY.—While working into this bay the Arrow struck on a shoal near the Berg River. Bearings taken on the shoal as follows: the Great Picket Berg S. 50° E. (Mag.); Fish-houses on the beach S. 87° W. (Mag.)

Other dangers are reported by the fishermen, viz.: the Britannia Rock, on which the sea breaks in blowing weather, about 9 miles N.W. of the Paternosters. Another rock W.N.W. 3 miles, and a rock lying E.N.E. from Cape St. Martin. One of the fishermen represents the Britannia Rock to be North 5 miles from the Paternosters, and that it is dry at low water spring tides. Observed the Paternosters to extend nearly $1\frac{1}{2}$ miles farther to seaward than represented in the Admiralty Chart.—*Remarks of Capt. W. Robinson, H.M.S. Arrow*, 1843.

PORT NATAL.—The harbour, though apparently of several miles extent is in reality confined to a narrow channel of from 14 to 20 feet depth at low water, the remaining part being sand-banks left uncovered when the tide is out. The islands in it are principally Mangrove swamps. The almost invariable winds are from West to S.S.W. and N.E. The strength of tide varies, at springs, from $2\frac{1}{2}$ knots up the harbour to $4\frac{1}{2}$, where it is confined at the entrance.

A reef runs off from the point of the thickly wooded promontory which forms the southern shore. This reef forms one side of the bar while the opposite side is a bank of sand. The bar varies both in position and depth; from October to February, during which period the most rain falls, it is forced farther out and deepens, while in the dry months when the N.E. winds prevail the sand accumulates. At the time of Lieut. Nourse's visit (1843) there were 17 feet at N.W. spring tides.—*Remarks of Lieut. Nourse of H.M.S. Fawn*, 1843.

BREAKERS NEAR C. COMORIN.—Captain Charles Hope, of H.M.S. Thalia, in January, 1844, reported to Vice-Admiral Sir W. Parker, as follows:—At 4h. 30m. P.M. Dec. 4, 1843, in lat. 8° 4′ 30″ N., lon. 77° 50′ E., we discovered to the eastward of Cape Comorin breakers N.W. $\frac{1}{2}$ W. three-quarters of a mile off. Extreme of the land W. by S. to N.E. by N. conical peak of Ghaut Mountain, W. $\frac{1}{2}$ S.

In standing in we shoaled suddenly from 11 to $5\frac{1}{2}$ fathoms, when we saw the breakers, and tacked immediately.

We were $3\frac{1}{2}$ miles from the nearest land at the time, and had no reason to expect to see any breakers, as according to the Admiralty Charts that part of the coast is bold close to the land. Horsburgh does not allude to any breakers off that part of the coast.

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SIMON'S BAY, CAPE OF GOOD HOPE.—A light vessel, painted red, and carrying a revolving light at an elevation of 37 feet above the level of the sea, has been moored one cable's length North of the Roman Rocks, in 7½ fathoms. She will shew a red flag or a ball whenever a sail is in sight during the day.

ADEN BAY.—In rounding Ras Marbat for the anchorage, ships should take care to avoid a spit which projects 1½ or 2 cables N. by W. from the point; the buoy which has been placed on it is sometimes driven from its position in heavy gales.—*Remarks of Mr. Hilliard of H.M.S. Serpent*, 1845.

LACCADIVE ISLANDS.—In the present edition of Captain Moresby's chart of these islands, the longitudes have been corrected by the Trigonometrical Survey of India; according to which, Mangalore flag-staff is in 5° 24′ 45″ west of Madras Observatory, which is assumed to be in 80° 14′ 15″ east of Greenwich.—*Chart Office, East India House*, 1845.

TRINCOMALEE.—A new light was exhibited at the Flag Staff Point on 1st Oct. 1845. The light can be seen 15 miles off from any bearing between Pigeon Island and Foul Point.

Ships coming from the S.E. with a fair wind at night, in passing Foul Point, should on no account bring the light to the northward of W.N.W.; that bearing will lead more than half a mile northward of Foul Point Reef, in not less than 14 fathoms.

To anchor in Back Bay (which ships may safely do between the middle of March and the middle of October) having brought the light W.N.W., ships may steer directly for it, rounding Flag Staff Point close, and anchoring in 10 fathoms, with the light bearing S. by E. Small vessels may anchor in 6 or 7 fathoms with the light bearing S.E. by E.

Ships coming from the northward, and wishing to anchor in Back Bay, should not bring the light to bear westward of South; that bearing will lead 2 miles eastward of Pigeon Island, and nearly a mile eastward of the Lively Rocks. When quite sure of being to the southward of these rocks, ships may bring the light S. by E., and anchor as before directed.

Ships should not attempt the inner harbour during the night, except under the most favourable circumstances, and having a person on board possessing a local knowledge of the harbour and its entrance; in which case, being abreast of Flag Staff Point, the light kept N.N.W. ¼ W., will lead clear of the Chapel Rocks, the extreme of which is under water, and bears from the light S. 10° E. 2 miles.

*Master Attendant's Office, Trincomalee*, 10 *Oct.* 1845.

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ERRATA in Vol. I. of the Directory.

Page 245, line 30, *for* S. W. *read* N. W.
247, line 26, *for* Lon. 25° 46½′ E. *read* Lon. 25° 41½′ E.
248, line 1, *for* Lon. 26° 18′ E. *read* 26° 13′ E.